FRITZ!Box 6810 LTE

Installation
and Operation

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Symbols and Highlighting

Symbols and emphasized text are used to mark certain information in this manual.

Symbols

This symbol marks useful hints and tips.

This symbol indicates important instructions that must be observed to avoid malfunctions.

Highlighting

Marker	Example
Quotation marks designate elements in the user interface, path entries, and names of folders and files	“Home Network” “C:\Pictures” “Info”
Pointed brackets mark wild cards	‹Telephone number›
Blue, underlined text designates addresses to be entered in the browser	fritz.box
Blue text designates links and references within this manual	see page 128
Bold type emphasizes important words	Do **not** click ...

1 The FRITZ!Box 6810 LTE

Welcome! We are pleased you decided on a FRITZ!Box. The FRITZ!Box 6810 LTE is the hub of your home network, connecting your computers and network devices with the Internet. For fast Internet connections the FRITZ!Box uses the mobile communications standard LTE.

The FRITZ!Box supports the radio technologies WLAN and DECT. You can use the FRITZ!Box simultaneously as a wireless LAN base station for wireless devices like notebooks, tablets or smartphones and as DECT base station for your cordless telephones.

Connected telephones use the FRITZ!Box as a telephone system.

The FRITZ!Box integrates connected computers and network devices into your private home network, where all devices can exchange data with each other.

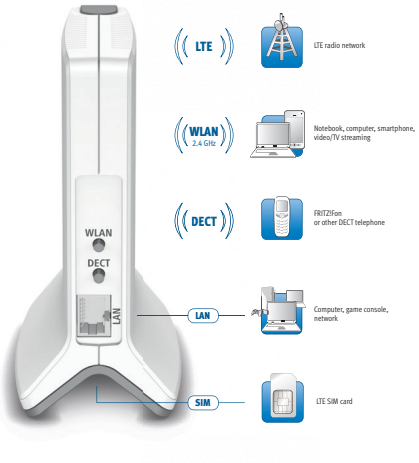
The FRITZ!Box offers you a full range of functions and settings so that you can set up a home network tailored to your needs.

In the settings of your FRITZ!Box you can access a user interface that is easy to operate in any web browser. Wizards guide you step by step through the setup of the most important FRITZ!Box functions, and comprehensive Online Help is available on every page of the user interface.

2 Ports, Interfaces, Buttons and LEDs

This chapter describes the ports, interfaces, buttons and LEDs of the FRITZ!Box.

2.1 Ports and Interfaces



Possibilities for connecting the FRITZ!Box

- **LAN**

  1 Ethernet port (10/100 Base-T) for connecting computers and other network devices like game consoles and network hubs

- **WLAN base station**

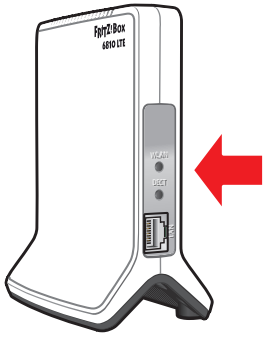
  Integrated WLAN base station for connecting to WLAN devices that use the radio standard IEEE 802.11b, IEEE 802.11g or IEEE 802.11n in the 2.4-GHz frequency band

- **DECT base station**

  Integrated DECT base station for connecting up to 6 cordless telephones that use the DECT standard

2.2 Buttons

The FRITZ!Box has two buttons on the back of the device.



FRITZ!Box buttons

“WLAN” Button

With the “WLAN” button you can turn the WLAN function on and off and connect wireless devices with the FRITZ!Box by WPS. WPS is an easy way to establish secure wireless connections (see page 19).

“DECT” Button

With the “DECT” button you can register cordless telephones on the FRITZ!Box (see page 32) and page misplaced cordless handsets (see page 82).

2.3 LEDs

LED	Condition	Meaning
Info	on	• Signals an event specified by the user
	flashing	• Updating FRITZ!OS, the firmware of your FRITZ!Box • Specified value for online meter reached • Signals an event specified by the user
	flashing red	Error: Open the FRITZ!Box user interface and follow the instructions on the “Overview” page
Phone	on	Telephone connection to the Internet is active
	flashing	Messages in your voicemail/e-mail inbox (this function must be supported by your telephony provider)
WLAN	on	WLAN function enabled
	flashing	• Enabling or disabling WLAN function • Adopting the WLAN settings • Performing WPS • WPS procedure aborted: More than two WLAN devices are performing WPS at the same time. Repeat the connection routine.
DECT	on	DECT function enabled
	flashing	Registration procedure for a DECT handset in progress
Power/LTE	on	• FRITZ!Box on standby • Device has electrical power and the LTE connection has been established
	flashing	• The device has electrical power • The LTE connection is being established or has been interrupted

“Info” LED

You can define what additional information should be displayed on the “Info” LED. For details, see the “System / “Info” Display” area of the FRITZ!Box 6810 LTE.

3 LTE: Radio Standard for Connecting to the Internet

LTE (Long Term Evolution) is a radio standard specified according to the 3GPP standard, Release 8. Within this standard the FRITZ!Box belongs to category 3 UE (user equipment).

Frequency Ranges

FRITZ!Box 6810 LTE supports two frequency bands:

- 791 - 862 MHz: the LTE band 20 is located in this range. This band is called the “digital dividend” spectrum.
- 2500 - 2690 MHz: the LTE band 7 is located in this range.

Channel Bandwidth

Within these two frequency bands the FRITZ!Box supports the channel bandwidths 5, 10 and 20 MHz.

The smaller the channel bandwidth, the lower the throughput:

20 MHz	up to 100 Mbit/s download up to 50 Mbit/s upload
10 MHz	up to 68 Mbit/s download up to 27 Mbit/s upload

All devices located in the same radio cell share the bandwidth and thus the throughput.

Antenna Technology

The FRITZ!Box supports Multiple-Input Multiple-Output (MIMO) antenna technology.

4 Before You Connect the FRITZ!Box

- Check the contents of your FRITZ!Box package. See the section Contents of the FRITZ!Box Package on page 12 for more information.
- Make sure that the requirements for connecting and operating the FRITZ!Box have been met. See the section Requirements for Operation on page 12 for more information.
- Please see the security and handling instructions in the section Security and Handling on page 13.

4.1 Contents of the FRITZ!Box Package

- FRITZ!Box 6810 LTE
- one power supply unit
- one network cable
- printed product information

4.2 Requirements for Operation

In order to operate the FRITZ!Box, you must have the following:

- a web browser that supports Java script (for instance, Internet Explorer version 8.0 or higher, or Firefox version 7 or higher)
- an LTE SIM card for the Internet connection
- for connecting computers via WLAN:

  computer with WLAN support (compliant with IEEE 802.11n, IEEE 802.11g, or IEEE 802.11b). Computers that do not have integrated WLAN can be equipped with WLAN support by installing a WLAN device like a FRITZ!WLAN USB Stick, for instance.
- for connecting computers using network cable:

  computer with a network port (network adapter standard Ethernet 10/100/1000 Base-T)

4.3 Security and Handling

Before installing and using the FRITZ!Box, please read the following security and handling instructions.

Safety Instructions

When connecting the FRITZ!Box 6810 LTE, be sure to observe the following security instructions in order to protect yourself and the FRITZ!Box from harm.

- Avoid overloading power outlets, extension cables and socket strips. Overloaded power supply components present a fire and electrocution risk.
  - Avoid using sockets strips and extension cords if at all possible.
  - Do not connect multiple extension cords or socket strips to each other.
- Make sure that the ventilation slits on the FRITZ!Box housing are always unobstructed. The ventilation slits provide for air cooling.
  - The FRITZ!Box should not be placed on a carpet or on upholstered furniture.
  - Do not cover the FRITZ!Box.
- Do not place the FRITZ!Box on excessively heat-sensitive surfaces, as the base of the device can heat up during normal operation.
- Do **not** install the FRITZ!Box during an electrical storm.
- During a storm, disconnect the FRITZ!Box from the power supply.
- Never let liquids get inside the FRITZ!Box. Otherwise, electric shocks or short circuits may result.
- Do not open the FRITZ!Box housing. The device contains hazardous components and should only be opened by authorized repair technicians.
- The FRITZ!Box is intended for indoor use only.

Handling the FRITZ!Box

- Place the FRITZ!Box in a dry location that is free of dust and protected from direct sunlight.
- When connecting the FRITZ!Box to your computer using a network cable, keep in mind that the cable can be no longer than 100 m.
- Use the alignment aid of the FRITZ!Box to determine the best possible position of the FRITZ!Box for LTE reception.

  The alignment aid is located in the FRITZ!Box user interface in the “Internet / LTE Information” menu, on the “Reception” page.
- Make sure to keep sufficient distance from potential sources of interference like microwave devices or electric devices with large metal housings.

5 Connecting the FRITZ!Box

- Insert the SIM card.
- Connect the FRITZ!Box to the power supply.

This chapter tells you how.

Before you connect the FRITZ!Box, note the additional instructions in the section Security and Handling on page 13.

5.1 Inserting the SIM Card

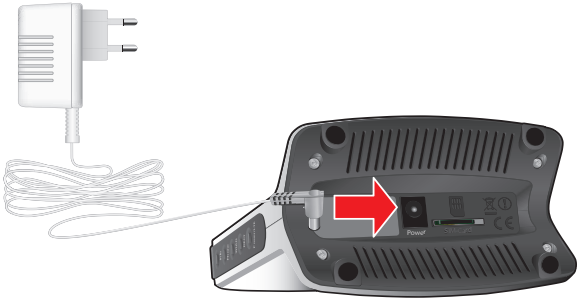
You received a SIM card from your LTE provider. This card must be inserted into the SIM card slot on the FRITZ!Box. The SIM card slot is located on the underside of the FRITZ!Box.

1. Pick up the FRITZ!Box so that you are facing the underside of the device and can read the “SIM Card ” label on the slot.
2. Insert the SIM card into the slot with the slanted edge of the card on the left and the contacts facing downwards.
3. Push the SIM card gently into the slot until it clicks into place.

   A few millimeters of the SIM card protrude from the slot.

To remove the SIM card, press it briefly.

5.2 Connecting to Electrical Power



Connecting to the power supply

1. Pick up the power supply unit included in the FRITZ!Box package.

Use only this power supply unit for connecting to electrical power.

1. Connect the power supply unit to the socket on the FRITZ!Box labeled “Power”.
2. Plug the other end into an AC power outlet.

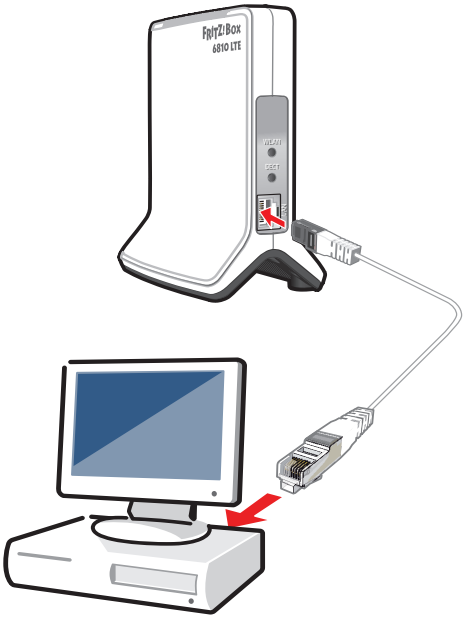
The “Power/LTE” LED begins flashing after a few seconds.

6 Connecting the Computer to the FRITZ!Box

You can connect a computer with the FRITZ!Box either using a network cable or wirelessly over WLAN.

A computer can be connected with the FRITZ!Box using only one of these methods. It is not possible to connect using the network cable and WLAN.

6.1 Connecting Computers to the LAN Port



Connecting a computer to the FRITZ!Box using a network cable

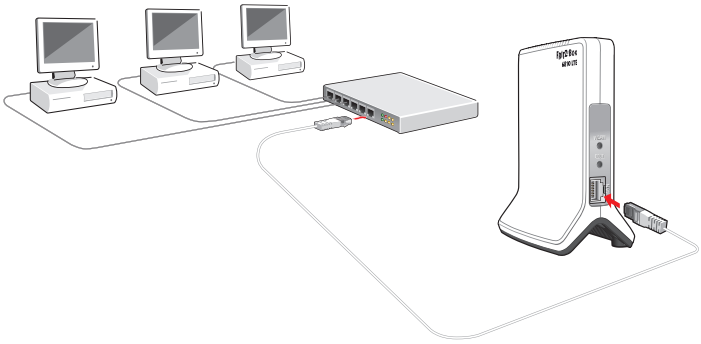
1. Set aside the network cable from the FRITZ!Box package.
2. If you work with a Linux operating system: Configure the network adapter of the computer with the setting “DHCP”.
3. Connect one end of the network cable to the network port (network adapter) of the computer.

4. Connect the other end of the network cable to one of the sockets on the FRITZ!Box labeled “LAN”.

Now the FRITZ!Box and the computer are connected to each other.

Connecting a Network Hub or Switch

You can also connect a network hub or switch to the LAN port on the FRITZ!Box.



Connecting the FRITZ!Box to a network hub

1. Set aside the network cable from the FRITZ!Box package.
2. Connect one end of the LAN cable to the uplink port (see glossary) of the network hub or network switch.
3. Connect the other end of the cable to the socket on the FRITZ!Box labeled “LAN”.

The FRITZ!Box and the network hub are now connected with each other.

6.2 Connecting Computers Wirelessly over WLAN

Using WLAN radio technology you can connect multiple computers with the FRITZ!Box wirelessly.

Please note the following before establishing a wireless connection between the computer and the FRITZ!Box:

- WLAN device

  A computer to be connected to the FRITZ!Box via WLAN must be equipped with a WLAN device for it to support WLAN. A WLAN device can be an external WLAN adapter—like a USB stick, for example—or a device integrated in the computer. Many modern computers and notebooks come with a WLAN device integrated.

- WLAN security settings

  In the FRITZ!Box, WLAN security settings are enabled upon delivery. Before a computer can establish a wireless connection to the FRITZ!Box, the WLAN security settings of the FRITZ!Box must be transferred to the WLAN device.

For more information on WLAN, see the section FRITZ!Box as a WLAN Base Station from page 56.

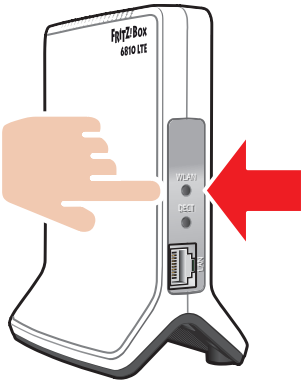
Establishing a WLAN Connection Using WPS

The FRITZ!Box supports WPS (Wi-Fi Protected Setup). WLAN devices that also support WPS can be connected with your FRITZ!Box securely using this method. All of the necessary WLAN security settings are transferred in the process. There are two kinds of WPS: the push-button method and the PIN method.

WPS with the Push-button Method

The push-button method (WPS PBC) can be used if your WLAN device is equipped with a WPS button, or if WPS can be enabled via the control software of the WLAN device.

1. Press the “WLAN” button on the FRITZ!Box until the “WLAN” LED begins flashing.



2. When the “WLAN” LED flashes, start WPS on the WLAN device. You have two minutes for this task.

   How to start WPS depends on the WLAN device. Either press a button on the WLAN device, or start WPS in the control software of the WLAN device.

The connection between the FRITZ!Box and the computer is established automatically. The computer is now connected with the FRITZ!Box.

WPS with the PIN Method

If your WLAN device supports WPS, but does not have a button to start the push method nor any possibility to enable it in its control software, use the PIN method to establish the WLAN connection.

You can choose between two methods:

- the FRITZ!Box specifies the PIN
- the WLAN device specifies the PIN.

The FRITZ!Box Specifies the PIN

1. Open the FRITZ!Box user interface.
2. Select the “WLAN / Security” menu.
3. Go to the “WPS Quick Connection” page.
4. Enable the setting “WPS enabled”.

5. Select the setting “PIN method (WPS-PIN), the FRITZ!Box specifies the PIN”.
6. The PIN will be displayed. Enter this PIN in the control software of the WLAN device.
7. Click “Start WPS”.

The “WLAN” LED on the FRITZ!Box flashes slowly, indicating that the WPS procedure has begun. Now a secure WLAN connection is being established between the FRITZ!Box and the WLAN device.

The WLAN Device Specifies the PIN

1. Open the FRITZ!Box user interface.
2. Select the “WLAN / Security” menu.
3. Go to the “WPS Quick Connection” page.
4. Enable the setting“WPS enabled”.
5. Select the option “PIN method (WPS-PIN), the WLAN device specifies the PIN”.
6. Now start the control software of the WLAN device. The program outputs a PIN for establishing a connection.
7. Enter this PIN in the FRITZ!Box user interface.
8. Click “Start WPS ”.

The “WLAN” LED on the FRITZ!Box flashes slowly, indicating that the WPS procedure has begun. Now a secure WLAN connection is being established between the FRITZ!Box and the WLAN device.

Transferring the WLAN Security Settings Manually

The WLAN security settings for WLAN devices can also be transferred manually. Manual transfer is unavoidable if a WLAN device does not support any methods for transferring the security settings automatically.

For manual transfer the WLAN security settings have to be entered in the WLAN software.

WLAN devices are generally delivered with their own WLAN software, which is installed in the computer along with the WLAN device. By now many operating systems have WLAN software included. Integrated WLAN devices sometimes use the operating system's WLAN software.

Installing a WLAN Device

If you need to use a separate WLAN device because you do not have one integrated, then install the WLAN device in the computer along with the corresponding WLAN software. Please take note of the instructions in the documentation of the device.

Transferring WLAN Security Settings

The values for WLAN security preconfigured in the FRITZ!Box have to be transferred to the WLAN device.

The values preset in the FRITZ!Box are printed on the sticker attached to the bottom of the housing. If you would like to establish a WLAN connection using these values, then your WLAN device must support the preset encryption method. If this is not the case, first change the settings in the FRITZ!Box. To do this, connect your computer and the FRITZ!Box using a network cable.

1. Start the WLAN software.
2. The following table presents the values that are possible for the connection between the FRITZ!Box and the WLAN device. Enter in the WLAN software the values set in the FRITZ!Box. If you changed the preconfigured values in the FRITZ!Box, then enter these changed values in the WLAN software.

SSID (Name of the WLAN radio network)	FRITZ!Box 6810 LTE
Encryption method	WPA2 (AES-CCMP)
Encryption	WPA2-PSK (AES)
WLAN key	The key is printed on the sticker attached to the bottom of the housing.
Network mode	Infrastructure

3. Confirm your entries using the relevant button in the user interface (for instance, “OK” or “Connect”.

Now your WLAN device and the FRITZ!Box are connected with each other wirelessly.

If the WLAN Device Does Not Support WPA

If your WLAN device does not support WPA encryption, you must convert the encryption set in the FRITZ!Box to WEP. For this you must change the WLAN settings in the FRITZ!Box:

1. Connct the FRITZ!Box and the computer using the network cable (white) with your computer (see the section Connecting Computers to the LAN Port on page 17).
2. Open the FRITZ!Box user interface (see the sectionOpening the User Interface on page 25).
3. Select the “WLAN / Security” menu.
4. Then select WEP encryption and enter a network key.
5. Click the “Apply” button.

   A window is displayed with the WLAN security settings.
6. Make a note of the settings or print out the page.
7. Close the user interface and clear the connection between the FRITZ!Box and the computer. Remove the network cable (white).
8. Configure your WLAN device with the security settings entered in the FRITZ!Box.

The WLAN connection between your WLAN device and the FRITZ!Box will be established.

We strongly recommend using a WLAN device that supports WPA or WPA2 (for instance, a FRITZ!WLAN USB Stick from AVM). WEP is out of date and data encrypted with WEP can be deciphered within minutes.

7 The FRITZ!Box User Interface

The FRITZ!Box has a user interface you can open in a web browser on your computer.

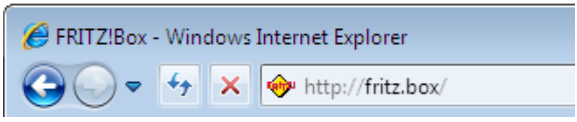
In the user interface you can set up the FRITZ!Box, enable or disable functions and receive information on the FRITZ!Box and on your connections.

7.1 Opening the User Interface

The FRITZ!Box user interface can be opened on every computer connected with the FRITZ!Box.

1. Start a web browser on your computer.
2. Enter fritz.box in the address line of the browser.

   The FRITZ!Box user interface opens.



Entering the address fritz.box in the browser

If the user interface does **not** open, see the instructions on resolving errors in the section from page 96.

The Wizard: Opening the User Interface for the First Time

When you open the user interface for the first time, a wizard starts to assist you in configuring the FRITZ!Box.

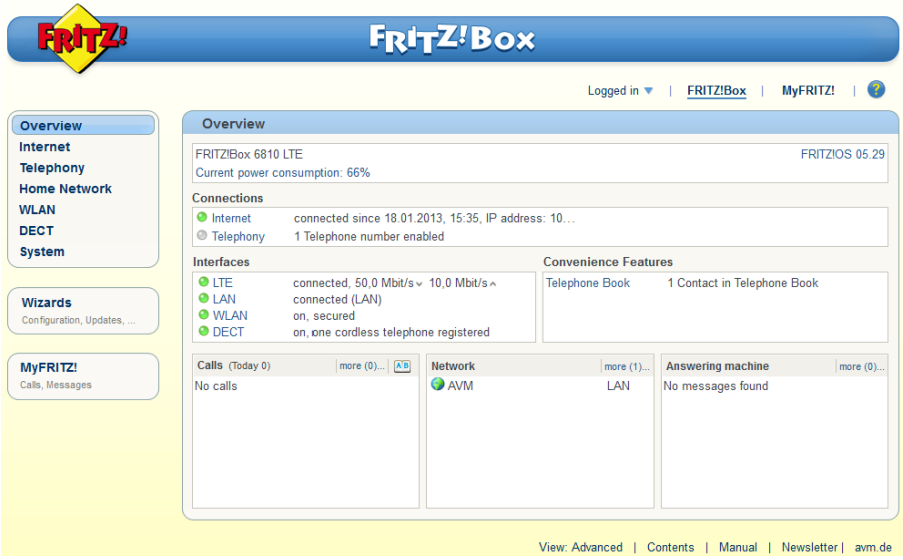
If you cancel the wizard, you can configure your FRITZ!Box without this wizard. You can change the settings configured with this wizard at any time.

For comprehensive information on configuring the many diverse functions of your FRITZ!Box, see the following chapters in this manual.

7.2 Overview: Everything at a Glance

All important information about the FRITZ!Box is displayed directly on the “Overview” page of the FRITZ!Box user interface.

By clicking the linked entries or “more...” you can jump from this page to the corresponding menus and configure settings there.



The FRITZ!Box “Overview” page

In the **upper** area of the window the FRITZ!Box is displayed with its complete product name, the currently installed version of FRITZ!OS, and its current energy consumption.

Depending on your settings, the following additional information is displayed here:

- If you assigned an individual name for your FRITZ!Box (see page 84), this name will be displayed here.
- If you use the automatic search for updates (page 40) and a new FRITZ!OS version is available on the AVM Update Server for your FRITZ!Box, you will be notified.

The **middle** area of the window presents information about connections, ports and configured convenience functions like MyFRITZ!, call diversion, guest access, remote maintenance, port forwarding and push service.

In the **lower** area of the window, the information is rounded out by the last telephone calls conducted, the list of connected devices like computers or telephones, and the telephone book entries edited last.

7.3 Standard View and Advanced View

The FRITZ!Box user interface has two views: the standard view and the advanced view.

In the standard view all of the settings required for everyday operation of the FRITZ!Box are at your disposal. Some pages and areas of the FRITZ!Box user interface are not displayed.

Upon delivery, the FRITZ!Box interface is set to display the standard view.

In the advanced view additional settings options appear under various menus and commands. The expanded menu items contain network and LTE settings for advanced users and are not required for normal FRITZ!Box operation.

Enabling this option is recommended only if you have advanced network expertise. When this setting is selected, settings can be configured which have the result that the FRITZ!Box user interface can no longer be opened.

Fast Switching between the Views

The “View” link in the link list of the FRITZ!Box allows you to switch immediately between the standard view and the advanced view.

7.4 Protecting the User Interface with a Password

You can protect the user interface of the FRITZ!Box with a password. The password will be requested every time the user interface is opened. This protects the settings of your FRITZ!Box from unauthorized access.

For reasons of security, we recommend setting up and using password protection for the user interface.

Setting Up Password Protection

As long as no password protection has been set up, every time you open the user interface you will be prompted to enter a password. If you disabled this message, here is how to set password protection:

1. Open the FRITZ!Box user interface (see page 25).
2. Go to the “System / FRITZ!Box Password” menu.
3. Enter a password and save the password by clicking “Apply”.

Password protection is now enabled.

Be sure to remember the password! If you forget the password, the factory settings will have to be restored to your FRITZ!Box. All of the settings you configured will be discarded. This is why we recommend saving the settings of your FRITZ!Box in a backup file (see page 29).

Forgot Your Password—What to Do?

If you have forgotten your password for the user interface, for reasons of security, you have to restore the factory settings to your FRITZ!Box:

1. Open the FRITZ!Box user interface (see page 25).
2. In the “Welcome to FRITZ!Box” window, click “reset” below the password prompt and follow the instructions on the screen.

   The FRITZ!Box is reset to the factory settings and then restarted. Afterward you can once again access the FRITZ!Box user interface.

3. After restarting, reconfigure the FRITZ!Box over the user interface or load your saved settings to the FRITZ!Box (see page 29).

This concludes the reset of the FRITZ!Box.

Logging Off the User Interface

When password protection is enabled, you can log off the user interface at any time. To do so, click the Logged in menu in the upper area of the “Overview” page and select “Log off”.

If you do not click on the user interface for a period of longer than ten minutes, you will be logged off automatically. The only pages excepted from this are those which are constantly updated, like the “Overview” page. No automatic logout will take place on these pages.

7.5 Saving the FRITZ!Box Settings

All of the settings you configure in your FRITZ!Box can be saved in a backup file on your computer. With this backup file you can restore your settings to the FRITZ!Box at any time or load your settings to another FRITZ!Box.

Saving and Restoring Settings

To save and restore your FRITZ!Box settings, use the “System / Save Settings” menu in the user interface. Here you can

- save your FRITZ!Box settings on the “Save” tab.
- restore all of your saved settings to **the same FRITZ!Box** on the “Restore” tab.
- load all of your saved settings to **another FRITZ!Box of the same model** on the “Restore” tab.
- load your saved settings to **another FRITZ!Box model** on the “Apply” tab. In this case you can select which settings are to be applied to the FRITZ!Box.

To load your saved settings to **another FRITZ!Box of the same model**, or to apply the **settings of another FRITZ!Box model** to your FRITZ!Box, the backup file must always be password-protected.

Instructions for saving, restoring and applying FRITZ!Box settings are presented in the user interface's Online Help.

8 Configuring an Internet Connection Into the LTE Network

The Internet connection for the mobile communications network has to be set up once in the FRITZ!Box, then it is always available.

Along with the SIM card, you received a PIN (Personal Identification Number) and a corresponding PUK (Personal Unlock Key) from your mobile communications network provider. Keep both numbers handy.

The first time you open the FRITZ!Box user interface, you will automatically be prompted to configure the Internet connection.

1. Start a web browser on your computer.
2. Enter fritz.box in the address field of the web browser.
3. The Wizard for configuring the Internet connection starts automatically.
4. Follow the instructions displayed on the screen.
5. As soon as you are prompted to do so, enter the PIN. If you enter the PIN incorrectly during login three times in a row, the device is blocked for further entries. With the PUK you can release this block.

9 Connecting Telephones and Other Terminal Devices

This chapter describes how to connect telephones, fax machines, answering machines and telephone systems (PBXs) to the FRITZ!Box.

9.1 Registering FRITZ!Fon and Other Cordless (DECT) Telephones

Up to six cordless telephones can be registered on the FRITZ!Box. The cordless telephones must support the DECT standard.

The cordless telephones FRITZ!Fon by AVM are the ideal complement to your FRITZ!Box 6810 LTE (see also AVM Products for the FRITZ!Box from page 119).

1. Start the registration of your cordless telephone with a base station.
2. Follow the directions on the display of the cordless telephone.
3. As soon as you are prompted to press the DECT, register, or paging button on the base station, press the “DECT” button on the FRITZ!Box.

   Hold the “DECT” button down for about 10 seconds until the “DECT” LED on the FRITZ!Box begins flashing.

4. If you are asked for the PIN of the DECT base station, enter the DECT pin of the FRITZ!Box.

   Upon delivery the PIN of the FRITZ!Box is “0000”.

   If you changed the PIN and forgot it, you can enter a new DECT PIN in “DECT / Base Station” menu of the FRITZ!Box user interface (see page 25).

The cordless telephone is connected with the FRITZ!Box.

9.2 Registering Smartphones with FRITZ!App Fon

The FRITZ!App Fon software connects your smartphone with the FRITZ!Box via WLAN. Calls you make from home then use not the mobile telephone network, but the telephone numbers set up in the FRITZ!Box.

The free FRITZ!App Fon software can be installed on an iPhone, iPod or iPad with iOS 4 or higher, and on Android smartphones with Google Android 2.1 or higher.

FRITZ!App Fon for Android smartphones is available at the Android Market. FRITZ!App Fon for iOS is offered in the Apple App Store.

Registering a Smartphone on the FRITZ!Box

1. Install FRITZ!App Fon on your smartphone.
2. Connect your smartphone with the FRITZ!Box via WLAN.

   To establish the connection you need the WLAN key of the FRITZ!Box. The preconfigured WLAN key is printed on the sticker on the underside of your FRITZ!Box.
3. Start the FRITZ!App Fon. If you protected the user interface of the FRITZ!Box with a password, enter the password to log in.

Once FRITZ!App Fon has been started, use your smartphone to make calls from home over the FRITZ!Box.

Defining Telephone Numbers for the Smartphone

A new telephone device for your FRITZ!Box is entered automatically in the FRITZ!App Fon. The name of the telephone device is listed in the FRITZ!App Fon under “More / FRITZ!Box”.

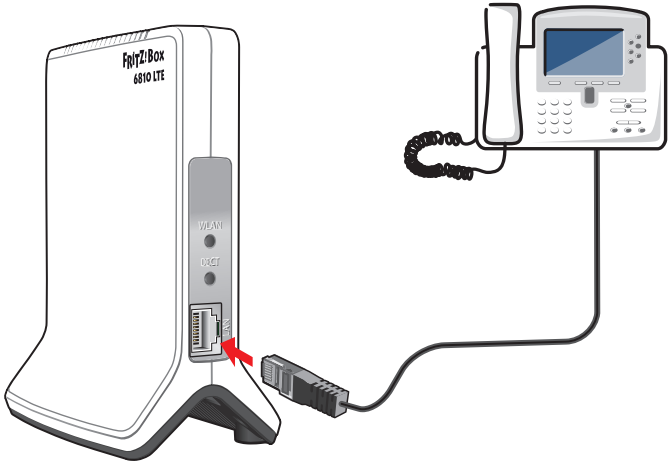
You can assign telephone numbers to this telephone to determine which telephone numbers are used to make calls with your smartphone from home. See the section Configuring Connected Telephones and Terminal Devices on page 37 for instructions.

9.3 Connecting an IP Telephone

Connect an IP telephone by plugging it into a network port on the FRITZ!Box or wirelessly via WLAN.

Connecting an IP Telephone to the LAN Port of the FRITZ!Box

IP telephones with a LAN port can be connected to the FRITZ!Box with a network cable.



Connecting an IP telephone to the LAN socket of the FRITZ!Box

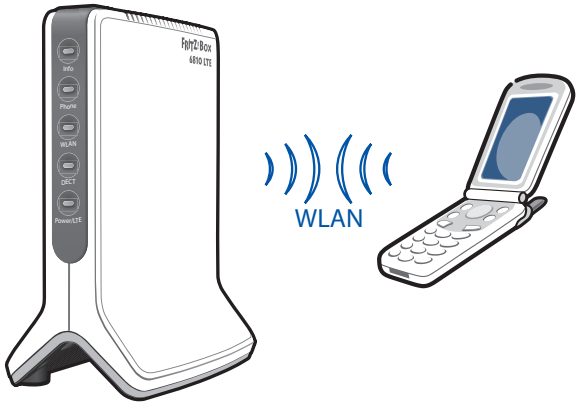
1. Connect a network cable to the IP telephone.
2. Connect the free end of the network cable to the LAN port on the FRITZ!Box.

The IP telephone is now connected with the FRITZ!Box.

You cannot make calls with the IP telephone yet. The IP telephone still has to be configured in the FRITZ!Box (see page 37).

Connecting an IP Telephone with the FRITZ!Box over WLAN

IP telephones that support WLAN can be connected wirelessly to the FRITZ!Box via WLAN.



Connecting an IP telephone with the FRITZ!Box over WLAN

1. Use your IP telephone to search for WLAN devices at your location.
2. Select your FRITZ!Box 6810 LTE from the list of WLAN devices found.
3. Enter the WLAN key of the FRITZ!Box.

   The preconfigured WLAN key is printed on the sticker on the underside of your FRITZ!Box.

Now the IP telephone will be connected with the FRITZ!Box.

You cannot make calls with the IP telephone yet. The IP telephone still has to be configured in the FRITZ!Box (see page 37).

10 Setting Up the FRITZ!Box for Telephone Calls

This chapter describes how to set up your FRITZ!Box for making telephone calls.

10.1 Entering Telephone Numbers in the FRITZ!Box

Enter your Internet telephone numbers in the FRITZ!Box.

Entering Internet Telephone Numbers

Your Internet telephone numbers must always be entered in the FRITZ!Box.

The FRITZ!Box requires the Internet telephone numbers and their corresponding login data to register the Internet telephone numbers at the registrar. The registrar is a server (computer) in the Internet that belongs to your Internet telephony provider.

Automatic Configuration of Internet Telephone Numbers

Some Internet telephony providers will configure your Internet telephone numbers in the FRITZ!Box automatically. This is known as remote configuration, and starts right after the FRITZ!Box is connected, or as soon as a start code is entered.

The FRITZ!Box receives the data for remote configuration from the provider's "auto configuration server" in the Internet.

The automatically configured Internet telephone numbers are located in the FRITZ!Box user interface under "Telephony / Own Telephone Numbers".

Entering Internet Telephone Numbers with the Wizard

You can enter multiple Internet telephone numbers from different providers in the FRITZ!Box.

1. Open the FRITZ!Box user interface (see page 25).
2. Click "Wizards".
3. Click "Manage Your Own Phone Numbers".
4. Click "Enter New Internet Telephone Number" and follow the Wizard's instructions.

You receive all account information (user name, password) from your Internet telephony provider.

Editing or Deleting Telephone Numbers

All telephone numbers you entered in the FRITZ!Box are listed under “Telephony / Own Telephone Numbers” in the user interface.

You can edit and delete telephone numbers here.

10.2 Configuring Connected Telephones and Terminal Devices

Once you have entered your telephone numbers, configure all of the connected telephones and other terminal devices in the FRITZ!Box. In the process you must define, depending on the type of device:

- The telephone number the terminal device uses to place outgoing calls to the public telephone network.
- Telephone numbers for accepting calls. A telephone can be set to ring for all incoming calls or only for calls to certain telephone numbers.
- Internal name for the terminal device. This name will be displayed, for instance, in the call list of the FRITZ!Box.

Setting Up Telephones and Terminal Devices with the Wizard

1. Open the FRITZ!Box user interface (see page 25).
2. Click “Wizards” in the menu.
3. Click “Manage Your Telephony Devices”.

   The telephones and other terminal devices that have already been configured are displayed in the user interface.
4. To set up a new terminal device, click “Configure New Device”. Follow the wizard’s instructions.

   Click the “Edit” button to open the settings of a terminal device.

Editing or Deleting Telephones and Terminal Devices

All telephones and other terminal devices you set up in the FRITZ!Box are listed under “Telephony / Telephony Devices” in the user interface.

Here you can edit the settings of terminal devices and delete terminal devices.

10.3 Making Telephone Calls

Once you have set up your telephones, you can make outgoing telephone calls to the public network and accept incoming calls.

A telephone places outgoing calls using the telephone number you defined for outgoing calls while setting up the telephone (see page 37).

For incoming calls a telephone reacts only to calls to those telephone numbers you assigned to the telephone during set-up (see page 37).

11 Firmware Update: Updating the FRITZ!OS

AVM provides free updates of the firmware for your FRITZ!Box. The firmware—called FRITZ!OS—is the software stored in the FRITZ!Box that controls all of the FRITZ!Box functions.

FRITZ!OS updates contain further developments of existing FRITZ!Box functions and often also introduce new functions for your FRITZ!Box.

A FRITZ!OS update is necessary if you would like to take advantage of further developments and new functions.

11.1 Searching for and Transferring FRITZ!OS Update with the Wizard

1. Open the FRITZ!Box user interface (see page 25).
2. Click “Wizards” in the menu and start the “Update Firmware” Wizard.

   The Wizard checks whether a FRITZ!OS update is available for your FRITZ!Box.

   If the Wizard finds an update, it displays the version number of the new FRITZ!OS. Click the link under the FRITZ!OS version to view information about further developments and new functions contained in the FRITZ!OS update. Read this information before starting the update.
3. To transfer FRITZ!OS update to the FRITZ!Box, click “Start Firmware Update Now”.

   The FRITZ!OS update begins and the “Info” LED on the FRITZ!Box starts flashing.

Do not interrupt the power supply to the FRITZ!Box during the FRITZ!OS update!

The FRITZ!OS update is complete when the “Info” LED stops flashing.

11.2 Automatic Search for Updates and Updating FRITZ!OS

With the AVM service “Search for updates automatically” you will always be informed about the latest FRITZ!OS updates for your FRITZ!Box. When a new firmware for your FRITZ!Box is found on the AVM website, you will be notified on the “Overview” page.

New updates are not installed automatically.

Updating FRITZ!OS

1. Open the “Overview” page.

   If an FRITZ!OS update for your FRITZ!Box is found, you will be notified with the message “The latest firmware is not installed: Update?”.

2. Click the “Update?” link to install the update.

3. To start the update, click in the next window on “Start Firmware Update Now”.

   The FRITZ!OS update begins and the “Info” LED on the FRITZ!Box starts flashing.

Do not interrupt the power supply to the FRITZ!Box during the FRITZ!OS update!

The FRITZ!OS update is complete when the “Info” LED stops flashing.

Disabling the Service

The service “Search for updates automatically” is set be default upon delivery of the FRITZ!Box, but you can disable it if desired.

1. Open the FRITZ!Box user interface (see page 25).

2. Select the “Contents” link in the footer.

   The contents page, or sitemap, of the FRITZ!Box user interface is opened.

3. Scroll down to the end of this page and click on the “AVM Services” link.

   The “AVM Services” page is opened.

4. Disable the setting “FRITZ!Box searches for updates periodically” and save your setting with “Apply”.

The AVM service “Search for updates automatically” is now disabled.

12 MyFRITZ!: Global Access to the FRITZ!Box

MyFRITZ! is an web service by AVM with which you can access your FRITZ!Box from anywhere in the world over the Internet.

- FRITZ!NAS: When you use MyFRITZ!, FRITZ!NAS is available everywhere. You can access photographs, music and documents located on the storage media connected to the FRITZ!Box.
- Answering machine: With MyFRITZ! you can listen to the messages on the answering machine of the FRITZ!Box from anywhere in the world.
- Call list: With MyFRITZ! you can view the call list in the FRITZ!Box from anywhere in the world.

The MyFRITZ! Principle

- Set up a MyFRITZ! account.
- Register your FRITZ!Box with your MyFRITZ! account.
- From wherever you are, you can access your FRITZ!Box from the www.myfritz.net page.

The MyFRITZ! Account

You need a MyFRITZ! account if you would like to use the MyFRITZ! service. Register your FRITZ!Box with your MyFRITZ! account. Every time the public IP address is changed, the FRITZ!Box now will transmit the changed IP address to the MyFRITZ! account. This ensures that the current, public IP address of the FRITZ!Box is always known. When you log in to MyFRITZ!, you will be forwarded to the FRITZ!Box using the IP address.

Setting Up a MyFRITZ! Account and Registering the FRITZ!Box

- Make sure that the Internet connection is active and that you can access your e-mail.
- You can set up the MyFRITZ! account in the FRITZ!Box user interface in the “Internet / MyFRITZ!” menu.

- Enter the following user data:
  - For the MyFRITZ! account, enter your e-mail address and assign a MyFRITZ password.
  - For access to the FRITZ!Box over the Internet, enter a FRITZ!Box Internet password. This password is requested by the FRITZ!Box whenever you want to access the FRITZ!Box via MyFRITZ!.
- You receive an e-mail from MyFRITZ! containing a registration link. If possible, open the e-mail on the computer on which you began to set up the account. Click the registration link.
- You are forwarded to the MyFRITZ! website, where you are prompted to read the terms of use and activate the account.
- Once the account has been activated successfully, you will be redirected to the FRITZ!Box user interface. Now the FRITZ!Box is registered with your MyFRITZ! account.

Using MyFRITZ!

As soon as you have created a MyFRITZ! account and registered your FRITZ!Box with the account, you can begin using the MyFRITZ! service.

1. Start the www.myfritz.net website.
2. Log in with your e-mail address and your MyFRITZ! password.
3. Click the “To My FRITZ!Box” button.
4. Enter the Internet password for your FRITZ!Box.

- You will be directed to the MyFRITZ! page of your FRITZ!Box.
- You have access to the storage media enabled for sharing, to the call list, and to the voice messages on the answering machine.
- Click the “FRITZ!Box” button to open the user interface of your FRITZ!Box.

MyFRITZ! in the Home Network

You can also use MyFRITZ! in the FRITZ!Box home network.

1. Enter “myfritz.box” in the address field of your browser.
2. Enter the Internet password for your FRITZ!Box.

You will be directed to the MyFRITZ! page of your FRITZ!Box. In this case you do not have to log in to MyFRITZ!.

Multiple FRITZ!Boxes

You can register multiple FRITZ!Boxes at one MyFRITZ! account.

- Every FRITZ!Box is registered with the MyFRITZ! account over your user interface. From the “Internet / MyFRITZ!” menu, select the setting “Register the FRITZ!Box with an existing MyFRITZ! account”.
- When you log in to MyFRITZ!, all registered devices will be displayed.

Security with MyFRITZ!

For the following MyFRITZ! activities the https security protocol is used:

- setting up a MyFRITZ! account with myfritz.net
- registration of the FRITZ!Box with the MyFRITZ! account
- accessing the MyFRITZ! page of your FRITZ!Box over myfritz.net
- accessing the user interface of the FRITZ!Box

  The FRITZ!Box generates its own https certificate. Because this certificate does not come from a certification authority preset in common browsers, you have to confirm that the connection should be established nevertheless. Firefox and Internet Explorer will remember your confirmation and refrain from showing any further warnings.

http is used for the daily update of the IP address on myfritz.net. The password is never transmitted as clear text.

13 FRITZ!Box as an Internet Router

The FRITZ!Box connects computers in your home network with the Internet. This chapter explains the possibilities offered by using the FRITZ!Box as an Internet router and how to take advantage of them.

13.1 Child Protection: Restricting Internet Access

The child protection feature allows you to define access rules to the Internet for individual computers or Windows users. These access rules may include restrictions of Internet access time, filter lists and a list with blocked network applications.

- Restrict Internet access time: Using the time restriction you can restrict the amount of time the user can surf the web. You can define on which days of the week, at what times of day, and for how long a computer or Windows user is allowed to use the Internet connection.
- Block or permit web sites: you can use filter lists to define which Internet pages are allowed to be accessed and to which access is blocked. For instance, you can block all Internet pages the government has defined as offensive or harmful to minors.

  You can create both filter lists, the whitelist and the blacklist. A whitelist contains all Internet pages to which access is allowed. A blacklist contains all Internet pages to which access is blocked.
- Block network applications: You can list network applications for which Internet access should be blocked. For instance, you can block Internet access for file-sharing software.

Child protection can be enabled for each computer individually, regardless of the computer's operating system.

You can also enable child protection individually for all Windows users in all Windows operating systems (Windows 7, Windows Vista and Windows XP). This option is useful if a computer is used by multiple users.

Setting Up Child Protection in the FRITZ!Box

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Internet / Filters” menu.
3. Set up child protection. See the Online Help available in the FRITZ!Box user interface for more information.

13.2 Port Forwarding: Making Computers Accessible from the Internet

With default settings in the FRITZ!Box, programs on your computer and LAN cannot be accessed from the Internet. For applications like online games and file sharing software or server services like HTTP, FTP, VPN, terminal and remote access servers you have to make your computer accessible for other Internet users.

Port Forwarding

Using port forwarding, you allow incoming connections from the Internet. By releasing certain ports for incoming connections, you grant controlled access to your computers in your network to other Internet users. Ports serve to assign incoming data packets to the various applications when all applications can be accessed at one IP address only.

The following port forwarding methods are possible in the FRITZ!Box:

PING	IPv4: The FRITZ!Box responds to ping inquiries from the Internet addressed to the IPv4 address of the FRITZ!Box.
	IPv6: The FRITZ!Box responds to ping inquiries from the Internet addressed to the IPv6 address of the FRITZ!Box. Additionally, you can set up PING6 port forwarding rules for each computer in the home network since each computer has its own globally valid IPv6 address.

TCP UDP	IPv4: Within IPv4 networks you can open the FRITZ!Box firewall for the protocols TCP and UDP when entering the port range. One port can be opened for exactly one computer.
	IPv6: Within IPv6 networks you can open the FRITZ!Box firewall for the protocols TCP and UDP when entering the port range. One port can be opened for each computer in the network.
ESP GRE	IPv4: Within IPv4 networks you can open the firewall for the two protocols ESP and GRE which do not use ports.
Exposed Host (Open firewall completely)	IPv4: Within IPv4 networks you can open the firewall for one computer completely. This computer is then no longer protected by the FRITZ!Box firewall. If individual ports are already open for other computers, then data packets for these ports are not forwarded to the exposed host but to the other computer instead.
	IPv6: Within IPv6 networks you can open the firewall for each computer completely. These computers are then no longer protected by the FRITZ!Box firewall.

Setting Up Port Forwarding in the FRITZ!Box

- IPv4: Port forwarding for IPv4 is set up in the “Internet / Permit Access” menu, on the “Port Forwarding” page.
- IPv6: Enable the advanced view. Port forwarding for IPv6 is also set up in the “Internet / Permit Access” menu, on the “IPv6” page.

Determining the IPv4 Address for Accessing the FRITZ!Box

If you have enabled ports for forwarding in the FRITZ!Box, other Internet users can access your computers at the IP address assigned to your FRITZ!Box by the Internet service provider. This is a public IPv4 address.

Here is how to determine the public IPv4 address of the FRITZ!Box:

1. Open any Internet page in order to establish an Internet connection.
2. Open the FRITZ!Box user interface and enable the advanced view in the user interface.
3. The FRITZ!Box's public IPv4 address is displayed on the "Overview" page in the "Connections" area.

Every time the Internet connection is interrupted the Internet service provider re-assigns the IP address. The IP address may change in the process. Therefore it is a good idea to use MyFRITZ! or dynamic DNS so that the IP address can always be reached under the same name. For more information about MyFRITZ!, see the section MyFRITZ!: Global Access to the FRITZ!Box on page 42. For more information about dynamic DNS, see the section Dynamic DNS: Name Instead of IP Address on page 48.

13.3 Dynamic DNS: Name Instead of IP Address

Dynamic DNS is an Internet service that makes it possible for the FRITZ!Box to remain accessible from the Internet at all times under a fixed name, even though the public IP address changes.

Dynamic DNS can be used as an alternative to MyFRITZ!. Both services can be used in parallel.

You must register with a dynamic DNS provider to use this service. When you register, you agree on the fixed name (domain name) at which your FRITZ!Box should be accessible from the Internet. You also define a user name and password.

Every time the IP address changes, the FRITZ!Box transmits the new IP address to the dynamic DNS provider in the form of an update request. Then the domain name is assigned to the current IP address by the dynamic DNS provider.

Setting Up Dynamic DNS in the FRITZ!Box

1. Open the FRITZ!Box user interface (see page 25).
2. Enable the advanced view.
3. Select the “Internet / Permit Access” menu.
4. Select the “Dynamic DNS” page and set up dynamic DNS. Consult the Online Help available in the FRITZ!Box user interface for more information.

13.4 Remote Access over HTTPS

With this function it is possible to access the user interface of the FRITZ!Box from another location. This allows you to configure settings in the FRITZ!Box or perform a FRITZ!OS update using a computer that is not in your own network (LAN or WLAN).

Setting Up Remote Access over HTTPS in the FRITZ!Box

1. Open the FRITZ!Box user interface (see page 25).
2. Enable the advanced view.
3. Select the “Internet / Permit Access” menu.
4. Select the “FRITZ!Box Services” page and enable the “Internet access to the FRITZ!Box via HTTPS enabled” option. For more information, see the Online Help.

13.5 Prioritization: Right of Way for Internet Access

Prioritization is a function you can use to specify that network applications and network devices be treated with higher or lower priority when they access the Internet connection. For example, you may wish to ensure that applications like Internet telephony, IPTV and video on demand are always treated with higher priority than other applications. You can also specify that file-sharing applications like eMule and BitTorrent always have to wait behind online games.

Categories for Prioritization

There are three categories for prioritization: “real-time applications”, “prioritized applications” and “background applications”. The categories are explained below.

Network applications and network devices are assigned to the categories using rules.

Real-time Applications

This category is suitable for applications with high demands on transmission speed and reaction times (for example, Internet telephony, IPTV, video on demand).

- Network applications of this category always have priority over other applications accessing the Internet at the same time.
- When the Internet connection is working at full capacity, the network packets of the applications of this category will always be sent first. In this case data from network applications assigned to other categories, like “prioritized applications”, will be transmitted later.
- If multiple network applications are assigned to this category, then they must share the available capacity.
- Whenever Internet telephony is included in this category, this application always has the highest priority, even over other real-time applications.

Prioritized Applications

This category is suitable for applications that require a fast reaction time (for example, company access, terminal applications, games).

- For network applications prioritized in this category, 90% of the FRITZ!Box's upload bandwidth is available, as long as no application from the "real-time applications" category requires bandwidth. The remaining 10% of the upload bandwidth is available for applications that are prioritized in lower categories or not prioritized at all.
- If multiple network applications are assigned to the "prioritized applications" category, then they must share the available capacity.

Background Applications

This category is suitable for applications that do not require any high transmission speed and which are not time-critical (for example, peer-to-peer services or automatic updates).

- Network applications assigned to this category are always treated with the lowest priority when the Internet connection is working at full capacity. So whenever an application from a different category or a non-prioritized application requires the entire bandwidth, all background applications must wait until bandwidth capacity becomes available again.
- If no other network applications are active, then the background applications receive the entire bandwidth.

Prioritization Method in the FRITZ!Box

The following algorithm is used in the FRITZ!Box to send data packets according to their prioritization:

- Change in the order in which packets are sent to the Internet (upstream direction)

  The order of the packets the FRITZ!Box receives from the Internet (downstream direction) cannot be changed.

- Discard low-priority packets in order to ensure the transmission of higher-priority packets. This algorithm is used whenever more packets are supposed to be sent to the Internet than the upstream transmission rate of the Internet connection allows.
- As long as no packets are being sent from higher-priority applications, the full transmission rate of the Internet connection is available for low-priority packets.

Setting Up Prioritization in the FRITZ!Box

1. Enable the advanced view.
2. Prioritization is set up in the “Internet / Filters / Prioritization” menu.

13.6 VPN: Remote Access to the Home Network

Via VPN (see glossary) a secure remote access to the network of the FRITZ!Box can be established. The VPN solution for the FRITZ!Box features the following:

- The VPN solution for the FRITZ!Box is based on the IPSec standard.
- Computer-LAN coupling and LAN-LAN coupling: VPN connections can be set up for individual remote computers or even for remote networks.
- A maximum of eight simultaneous active VPN connections is supported.
- The configuration files for the VPN connections are created using a separate program. The program is provided free of charge and can be downloaded from the AVM web site.
- A free VPN client for individual computers can also be downloaded from the AVM web site.

The AVM web site offers a Service Portal which presents comprehensive information on VPN in general and in connection with the FRITZ!Box. Visit this portal to obtain more detailed information.

avm.de/en/vpn

Setting Up VPN in the FRITZ!Box

1. Open the FRITZ!Box user interface.
2. Enable the advanced view.
3. Select the “Internet / Permit Access” menu.
4. Select the “VPN” page.

See the Online Help of the FRITZ!Box to set up VPN.

Supplementary Software for VPN

All of the information required for a VPN is saved in a configuration file. The terminals involved in any VPN must receive this file.

Individual computers that are networked over a VPN require a VPN client.

- “Configure FRITZ!Box VPN Connection” Wizard

  AVM provides the “Configure FRITZ!Box VPN” software for creating configuration files. This program is a Wizard that takes you step by step through the VPN configuration. All of the necessary VPN settings, like the encryption method and access rules, are set automatically. The resulting configuration files must be imported to the respective terminals of the VPN tunnel. At the terminal with the FRITZ!Box the configuration file is then imported to the FRITZ!Box. The VPN parameters in these files can be adjusted manually to connect to products by other manufacturers.

- The “FRITZ!VPN” VPN Client

  AVM offers the “FRITZ!VPN” software as a VPN client.

Both the Wizard and the client can be downloaded free of charge from the VPN Service Portal on the AVM web site:

avm.de/en/vpn

13.7 DNS Server: Freely Selectable

DNS servers are preset in the FRITZ!Box for IPv4 and IPv6.

These are the DNS servers assigned by the Internet provider.

For both IPv4 and IPv6, the preset DNS server can be replaced by a free DNS server. Free DNS servers include, for instance, OpenDNS and Google DNS.

Here is how to change the DNS server entry:

1. Open the FRITZ!Box user interface.
2. Enable the advanced view.
3. In the “Internet / Account Information” menu, select the “DNS Server” page.
4. Change the settings for the DNS servers.

The “DNSv6” page is displayed only if you enabled IPv6 support for the FRITZ!Box on the “IPv6” page.

13.8 DNSSEC: Security for DNS Queries

DNSSEC is short for Domain Name System Security Extensions. As the name says, this is an extension of DNS, the domain name system.

DNSSEC ensures that both the DNS server and the information returned by the DNS server are authentic, or genuine.

Security with DNSSEC

When a home user surfs the web, she or he sends queries to the Internet by entering URLs in the address field of the browser. A URL is the name of a web site that is easy to remember, such as avm.de/en. Every query is sent to the DNS server first. The DNS server resolves the URL into the corresponding IP address. There is one unambiguous IP address for every URL.

The home user relies on the authenticity of the IP address returned by the DNS server. Authentic means that the response is the IP address of the desired web site, and not a faked IP address that leads to a fake web site. DNSSEC can ensure that the returned addresses are authentic.

Support with the FRITZ!Box

The FRITZ!Box supports DNSSEC queries over UDP.

The FRITZ!Box has a DNS proxy. The computers in the home network use the FRITZ!Box as a DNS server. The FRITZ!Box forwards DNSSEC queries from the home network to the Internet. The FRITZ!Box forwards DNSSEC responses from the Internet to the home network. The DNSSEC information must be validated on the computer in the home network. For this DNSSEC must be supported in the operating system.

14 FRITZ!Box as a WLAN Base Station

The FRITZ!Box is a WLAN base station for WLAN devices like notebooks, tablets or smartphones. The FRITZ!Box can establish WLAN connections compliant with the fast WLAN N standard. The FRITZ!Box is preconfigured with an encryption method from today's safest method WPA2. This encryption method is supported by most of the latest WLAN devices. The FRITZ!Box supports wireless LAN convenience functions like guest access, night service and WPS Quick Connection.

14.1 Connecting WLAN Devices Securely with the FRITZ!Box

In a WLAN radio network security is of the utmost importance. This is why WLAN connections between the FRITZ!Box and your wireless devices are encrypted. For encryption the FRITZ!Box and your wireless devices must use the same encryption method. The FRITZ!Box is preconfigured with an encryption method that combines today's safest methods WPA and WPA2. These encryption methods are supported by most of the latest wireless devices.

If you would like to use wireless devices that do not support WPA2 or WPA, you can switch encryption in the FRITZ!Box to the older, less secure WEP method. You can also establish non-encrypted wireless LAN connections. However, if at all possible we recommend always establishing WPA2 wireless LAN connections.

WLAN devices can be connected with the FRITZ!Box automatically or manually. A particularly simple and secure automatic method is WPS, with which a WLAN connection can be established at the touch of a button. For manual WLAN connections with the FRITZ!Box use the WLAN software of your WLAN device or the WLAN program on your computer.

Connecting WLAN Devices Automatically (WPS)

WLAN devices that support the fast connection method WPS can be connected with the FRITZ!Box automatically.

1. Start the WPS function of your WLAN device. Consult the documentation of the WLAN device to find out how to start WPS.
2. Press the WLAN button on the FRITZ!Box until the “WLAN” LED begins flashing. You have two minutes for this task.
3. Your WLAN device and the FRITZ!Box now establish a secure WLAN connection automatically. The FRITZ!Box “WLAN” LED stops flashing and remains on.

With this, the WLAN connection is established. Your WLAN device is integrated into your home network and can use the Internet connection of the FRITZ!Box.

Connecting WLAN Devices Manually

You can connect WLAN devices with the FRITZ!Box manually. WLAN devices like notebooks, tablets and smartphones use the WLAN software of their own operating system for this connection. A WLAN adapter at the USB port of your computer can use the WLAN software of your computer or a WLAN program of your own. No matter what program is used to establish the WLAN connection, the principle is the same: the WLAN software searches for a WLAN radio network in the vicinity and, after authorization with a WLAN key, enables the WLAN connection between the FRITZ!Box and your WLAN device.

1. Make sure that the WLAN function of the FRITZ!Box is enabled and the “WLAN” LED is on. If “WLAN” is not on, press the “WLAN” button briefly.
2. Start the WLAN software of your WLAN device. Consult the documentation of your WLAN device for instructions.
3. Search for the WLAN radio network of your FRITZ!Box. Upon delivery this network is called “FRITZ!Box 6810 LTE”.

4. Enter the WLAN key of the FRITZ!Box.

With this, the WLAN connection is established. Your WLAN device is integrated into your home network and can use the Internet connection of the FRITZ!Box.

14.2 Connecting WLAN Devices with the FRITZ!Box Guest Access

With the FRITZ!Box you can provide your guests with an Internet connection of their own. At this guest access they can surf the web with their own smartphones or tablets, but cannot access the contents of your home network.

1. Open the FRITZ!Box user interface.
2. Make sure that the wireless radio network (WLAN) is enabled in the “WLAN / Radio Network” menu.
3. Select the “WLAN / Guest Access” menu and enable guest access.
4. Assign a name for the guest wireless network (SSID) and enter a WLAN key at least 20 characters long under “Security”.

This concludes the setup of your guest access. Now guests can register their WLAN devices with the FRITZ!Box.

1. Your guest starts the WLAN software of her or his WLAN device, searches for your guest wireless network and enters the WLAN key you specified for authorization.
2. The WLAN connection will be established.

Your guest’s WLAN device can use the Internet connection of the FRITZ!Box, but has no access to your home network. For more information, see the Online Help.

14.3 Switching the WLAN Radio Network On and Off by Schedule

You can switch the WLAN radio network of the FRITZ!Box automatically according to a schedule. This function is called “night service” and reduces the power consumption of the FRITZ!Box by completely turning off the WLAN module. The FRITZ!Box night service also affects any other FRITZ! products connected in the network (FRITZ!WLAN Repeater, for instance) by switching the WLAN transmission of these devices on and off as well.

1. Open the FRITZ!Box user interface.
2. Open the “System / Night Service” menu.
3. Enable the schedule for the WLAN radio network.

   With the options “Switch WLAN off daily” and “Switch WLAN off according to schedule” you define the intervals of the schedule. You can also select the option “The radio network cannot be switched off until no more WLAN devices are active”.

For more information on these settings, see the Online Help.

Switching WLAN on and off Manually

You can switch the wireless radio network of the FRITZ!Box on and off at any time, even when the device is hibernating.

- Press the “WLAN” button on the FRITZ!Box briefly

  or

- Switch on the wireless LAN radio network using a connected telephone

  WLAN on #96*1*

  WLAN off #96*0*

14.4 Enlarging the WLAN Radio Network

The range of a WLAN radio network is not specified. It depends on

- the WLAN devices you are using for your WLAN connections
- interference in the vicinity of your WLAN radio network
- the structural conditions where you operate the WLAN radio network
- the number of WLAN devices in the vicinity of your FRITZ!Box that work in the same frequency range

You can extend the range of your WLAN radio network with a WLAN repeater.

Or you can set up a second WLAN router, for instance a second FRITZ!Box as a WDS repeater.

Expanding a WLAN Radio Network with a WLAN Repeater

You can expanding your WLAN radio network with a WLAN repeater. In combination with the FRITZ!Box the AVM FRITZ!WLAN repeaters are especially suitable. All models of the FRITZ!WLAN Repeater series can be integrated into your WLAN radio network and your home network by WPS Quick Connection. Find out more in the Internet at:

avm.de/en/Produkte/FRITZ_WLAN

Expanding a WLAN Radio Network with a WDS Repeater

You can expand the WLAN radio network of your FRITZ!Box with what is called a WDS repeater. A WDS repeater can be a FRITZ!Box or any WLAN router you already have that can be configured as a WDS repeater to expand your WLAN radio network.

See the documentation of your device to find out whether your existing WLAN router supports the WDS function and how to configure it as a WDS repeater.

The wireless LAN connection between your FRITZ!Box and a FRITZ!Box in WDS operation can be encrypted by WPA2. The wireless LAN connection between your FRITZ!Box and another wireless LAN router is only possible with less secure WEP encryption.

14.5 WLAN—Getting Technical

A wireless LAN radio network is based on standards defined by the Institute of Electrical and Electronic Engineers (IEEE). These standards describe, for instance, the transmission speeds, encryption methods and frequencies used in a wireless LAN network.

WLAN Standards

The Institute of Electrical and Electronic Engineers (IEEE) defined the WLAN standards IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n and IEEE 802.11i for WLAN radio networks.

Standards for the Throughput Rate

The throughputs listed differentiate between gross and net transmission rates. The net speed describes the transmission rate of the user data.

The FRITZ!Box supports your choice of the standards IEEE 802.11b, IEEE 802.11g and IEEE 802.11n. WLAN devices based on one or more of the standards listed can be used for WLAN connections with the FRITZ!Box.

Standard	Frequency Band	Gross Data Throughput up to	Net Data Throughput up to
802.11b	2.4 GHz	11 Mbit/s	5 Mbit/s
802.11g	2.4 GHz	54 Mbit/s	25 Mbit/s
802.11n	2.4 GHz	300 Mbit/s	100 Mbit/s

IEEE 802.11b

With a maximum throughput rate of 11 Mbit/s, this is the oldest WLAN standard. Older WLAN devices of the first generation can communicate with the FRITZ!Box using 802.11b. However, if the WLAN device supports newer standards such as 802.11g, the latest standard should be used.

IEEE 802.11g

This is currently the most common WLAN standard. It communicates with a maximum of 54 Mbit/s gross in the 2.4-GHz frequency range (ISM) and guarantees broad compatibility with many WLAN devices.

IEEE 802.11n

This standard allows for high throughput rates and ranges. The FRITZ!Box supports 802.11n in the 2.4-GHz frequency band. Modulation processes and antenna techniques like MIMO (Multiple Input, Multiple Output) use the frequency band more effectively than the older standards.

The use of the 802.11n standard—and thus the availability of higher throughput rates—is possible only if the WLAN connection is secured using the WPA2 security mechanism (AES-CCMP).

Thanks to compatibility with the 802.11g standard, you can also continue to use older WLAN devices.

Setting the Right Standard in the FRITZ!Box

The throughput rate that can be achieved in your WLAN radio network depends on the WLAN standards used by the integrated WLAN devices. These WLAN standards must also be set in the FRITZ!Box. Proceed as follows to check which WLAN standards are set and change them if needed:

1. Open the FRITZ!Box user interface.
2. Enable the advanced view.
3. Open the “WLAN / Radio Channel” menu and select “Adjust radio channel settings” to make the desired changes.

Make a note of which standards the WLAN devices in your network are compatible with and then adjust the FRITZ!Box settings according to the following information:

- Your radio network integrates only WLAN devices that are compatible with one or both of the following standards:

  802.11n

  802.11g

  Set the following mode in the FRITZ!Box:

  Mode: 802.11n+g

  The 2.4-GHz frequency band will be used.

- Your radio network integrates only WLAN devices that are compatible with one or both of the following standards:

  802.11b

  802.11g

  Set the following mode in the FRITZ!Box:

  Mode: 802.11b+g

  The 2.4-GHz frequency band will be used.

- Your radio network integrates only WLAN devices that are compatible with one or several of the following standards:

  802.11n

  802.11g

  802.11b

  Set the following mode in the FRITZ!Box:

  Mode: 802.11n+g+b

  The 2.4-GHz frequency band will be used.

The Standard for Security

IEEE 802.11i

The WPA2 security mechanism is defined in the IEEE 802.11i standard. WPA2 is an extension of the familiar security mechanism WPA (Wi-Fi Protected Access).

The main feature of the extension of WPA to WPA2 is the AES-CCMP encryption process.

Mechanism	Encryption
WPA	TKIP (Temporary Key Integrity Protocol)
WPA2	TKIP AES-CCMP based on the extremely secure AES (Advanced Encryption Standard) procedure. CCMP (Counter Mode with CBC-MAC Protocol) defines how the AES procedure is applied to WLAN packets.

FRITZ!Box supports the AES encryption procedure as part of the WPA2 mechanism, and the TKIP encryption procedure as part of the WPA mechanism. This means that the FRITZ!Box can be used in combination with any WLAN devices that also support WPA2 with AES or WPA with TKIP.

Frequency Ranges

WLAN uses the frequency ranges at 2.4 GHz and 5 GHz as its transmission range.

With the FRITZ!Box you can establish WLAN connections in the 2.4-GHz range.

2.4-GHz Frequency Band

In the 2.4-GHz frequency band WLAN works in the same range as Bluetooth, microwave devices and various other devices like radio-controlled toys, garage-door openers and video bridges. This means that interference may occur within WLANs operated in the vicinity of such devices. Generally this has adverse effects on the transmission rate, including aborted connections.

In the 2.4-GHz frequency range the European regulation authorities have designated 13 channels for WLAN.

A channel can have a bandwidth of 20 MHz (throughput of up to 130 Mbit/s) or 40 MHz (throughput of up to 300 Mbit/s).

Channels located directly next to each other in the 2.4-GHz band may overlap and result in mutual interference. For instance, if several WLANs are operated close to each other in the 2.4-GHz frequency range with a bandwidth of 20 MHz, a distance of at least five channels should be left empty between each two channels used. This means that if channel 1 is selected for one WLAN, the channels 6 through 13 can be selected for a second WLAN. This maintains the minimum distance between channels.

Should interference in a WLAN persist, the first step should be to select a different channel.

WLAN Autochannel

With the WLAN autochannel function, the FRITZ!Box automatically searches for the channel subject to the least interference. This process takes into consideration interference from radio networks in the vicinity (WLAN base stations) and potential sources of interference (for instance video bridges, baby monitors, microwave ovens). Should problems with interference persist despite this function, try to identify the source of interference and switch it off manually.

Additional tips on interference in the WLAN radio network are presented in the section Ruling Out Interference from Other Wireless Networks from page 103.

Allocation of the WLAN Channels in the 2.4-GHz Range

Channel	Frequency (GHz)	Channel	Frequency (GHz)
1	2.412	8	2.447
2	2.417	9	2.452
3	2.422	10	2.457
4	2.427	11	2.462

Channel	Frequency (GHz)	Channel	Frequency (GHz)
5	2.432	12	2.467
6	2.437	13	2.472
7	2.442		

15 FRITZ!Box as a Telephone System

The FRITZ!Box is a telephone system (or PBX: Private Branch Exchange) for Internet telephony. This chapter describes convenience functions for the telephone system that can be configured in the FRITZ!Box user interface, for instance telephone books, answering machines and call diversion.

You will also find out which convenience functions can be used to make calls, for instance internal calling, alternating between calls, forwarding calls and three-party conferences.

15.1 FRITZ!Box Telephone Book

The FRITZ!Box provides a telephone book.

If you enable “click to dial”, you can make calls by simply clicking a telephone number in the telephone book.

The telephone book and the click to dial feature are available in the FRITZ!Box user interface (see page 25) under “Telephony / Telephone Book”.

Individual Telephone Books for Your FRITZ!Fon

If you have a FRITZ!Fon cordless telephone from AVM, you can use the FRITZ!Box telephone book on the FRITZ!Fon.

If you have multiple FRITZ!Fon cordless telephones, you can set up a separate telephone book of its own for each FRITZ!Fon. Up to 6 telephone books can be saved in the FRITZ!Box.

Setting Up a New Telephone Book

1. Open the FRITZ!Box user interface (see page 25).
2. Select “Telephony / Telephone Book”.
3. Click “New Telephone Book”.
4. Enter a name for the telephone book in the “Name” field.
5. Select a telephone book or disable the option “Copy existing telephone book”. If you disable this option, the new telephone book will be empty.

6. Click the “OK” button.

The new telephone book is saved in the FRITZ!Box.

Selecting a Telephone Book for FRITZ!Fon

1. Open the FRITZ!Box user interface (see page 25).
2. Select “DECT”.
3. Choose a FRITZ!Fon and click the “Edit” button.
4. Select a telephone book from the drop-down list.
5. Click the “OK” button.

The telephone book is now available on the FRITZ!Fon.

15.2 The FRITZ!Box Call List

The FRITZ!Box saves your outgoing and incoming telephone and fax calls in the call list. The call list also shows which calls you missed (missed calls).

In the FRITZ!Box user interface the call list is found in the “Telephony” menu.

Transfer to Telephone Book

Callers from the FRITZ!Box telephone book appear in the call list along with their names.

Telephone numbers that are not saved in the telephone book can be added to the telephone book from the call list with the click of a mouse.

Saving the Call List as a CSV File

You can save the call list as a CSV file on your computer. The CSV file can then be opened and edited in spreadsheet software.

15.3 Setting Up FRITZ!Box Fax Reception

With the FRITZ!Box you can receive faxes without having to connect a fax machine. The fax machine automatically forwards faxes received to one or multiple e-mail addresses, which you can define in the FRITZ!Box.

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Telephony / Telephony Devices” menu.
3. Click “Configure New Device”.
4. Select the “Fax function” option and confirm by clicking “Next”.
5. Enter a fax ID for fax reception. This could be your fax number or name, for instance.
6. Enter the e-mail address to which received faxes should be forwarded.

   You can also enter multiple e-mail addresses. Use a comma to separate the individual addresses.
7. Confirm with “Next”.
8. Select one or multiple telephone numbers you would like to use exclusively for fax reception.
9. Confirm by clicking “Next” and “Apply”.

15.4 Setting Up Call Diversion

You can configure multiple call diversion modes with different settings in the FRITZ!Box.

Call diversion can either divert all incoming calls or only certain calls.

You can divert the calls to an external telephone number, to a certain telephone, or to an answering machine.

Examples for Call Diversion Settings

- All incoming calls will be diverted to another telephone line.
- Calls that come from a certain telephone number will be diverted to your mobile telephone number.
- Anonymous calls in which the caller does not transmit a telephone number will be diverted to an answering machine.

Setting Up a New Call Diversion Setting

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Telephony / Call Diversion” menu.
3. Click “New Call Diversion”.
4. Define which calls should be diverted.
5. Define the destination and the type of call diversion.
6. Save the settings by clicking “OK”.

Call diversion is set up.

All configured call diversion settings can be viewed in the user interface in the “Telephony / Call Diversion” menu. All call diversion settings can be disabled or deleted here.

15.5 Saving Costs with Dialing Rules

A dialing rule defines which telephone number the FRITZ!Box uses for outgoing calls in a certain number range (for instance, mobile telephone numbers, international telephone numbers).

If you have multiple telephone numbers, you can use dialing rules to have each outgoing call automatically placed using the most economical telephone rate.

Setting Up New Dialing Rules in FRITZ!Box

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Telephony / Dialing Rules” menu.
3. Click the “New Dialing Rule” button.
4. Define the range of telephone numbers or the telephone number to which the dialing rule should apply.
5. Select a telephone number from the “Connect via” drop-down list.
6. Save the settings by clicking “OK”.

Now the dialing rule has been set up.

15.6 Blocking Telephone Numbers and Callers

In the FRITZ!Box you can block telephone numbers for outgoing and for incoming calls.

- Blocking telephone numbers for outgoing calls.

  Blocked numbers and number ranges (for instance, mobile communications networks) can no longer be called from the FRITZ!Box.

- Block telephone numbers for incoming calls:

  If a number has been blocked for incoming calls, the FRITZ!Box will no longer accept any calls from this telephone number. However, the FRITZ!Box can only recognize a blocked telephone number if the caller allows transmission of her or his telephone number.

  You can also block all **anonymous** incoming calls, for which the caller has suppressed transmission of the telephone number.

Setting Up a New Call Block

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Telephony / Call Blocks” menu.
3. Click the “New Blocking Rule” button.
4. Select whether the call block is to apply to incoming or outgoing calls.
5. Enter a range of numbers or a number.
6. Save the settings by clicking “OK”.

The call block is now set up.

15.7 Setting Up Do Not Disturb

In the FRITZ!Box night service you can set up a Do Not Disturb function so that none of the connected telephones and other terminal devices signal calls. At a time freely defined by the user (for instance 11:00 p.m. – 6:00 a.m.) the terminal devices then will be set as follows:

- Connected telephones will not ring.

  This is not the case for IP telephones. It is not possible to set up Do Not Disturb for IP telephones in the FRITZ!Box.

- Connected fax and answering machines are disabled.

Turning Do Not Disturb On/Off

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “System / Night Service / Do Not Disturb” menu.
3. Enable the “Do Not Disturb enabled” option and define the time period during which the telephones should not be able to ring every day.
4. Save your settings by clicking “Apply”.

Do not disturb is now enabled.

To have the telephones ring again, disable the “Do Not Disturb enabled” option and then click “Apply”.

Instead of setting the Do Not Disturb setting for all telephones, in the FRITZ!Box you can also set the Do Not Disturb feature for individual telephones. The Do Not Disturb function for an individual telephone is set up in the telephone settings. In the user interface of the FRITZ!Box, these settings can be opened for editing in the “Telephony / Telephony Devices” menu.

15.8 Setting Up the Alarm

In the FRITZ!Box you can set an alarm. When an alarm is set and enabled, a telephone connected to the FRITZ!Box will ring at the specified time.

Setting the Alarm in FRITZ!Box

1. Open the FRITZ!Box user interface (see page 25).
2. Select the “Telephony / Alarm” menu.
3. Enable the alarm and enter a time.
4. Select which telephone should ring at the specified time.
5. Define here whether the alarm should be repeated.
6. Save your settings by clicking “Apply”.

Now the alarm is set up and enabled.

15.9 Enabling the Baby Monitor

When the baby monitor is enabled for a telephone, the telephone automatically calls a previously specified telephone number whenever the volume in the room reaches a defined level. If the telephone is in the same room as your child, you can use this function to monitor its sleep.

Enabling Baby Monitor	
☎	Pick up the handset or activate the speaker phone function of your telephone. We recommend using a device with a speaker phone function.
✱4 ‹Level› ✱ ‹Telephone number› #	Enables the baby monitor. ‹Level›: Sound level at which a call is triggered. Enter a numeral between 1 (the most sensitive setting) and 8. ‹Telephone number›: The telephone number to be called. Enter an internal telephone number (see page 75), the number 9 for an internal group call, or any external telephone number desired.
•••	Wait for the second-long acknowledgement tone.
	Do **not** hang up the handset!
	The baby monitoring function is now enabled. As soon as the volume in the room reaches the specified level, the telephone will dial the telephone number you entered. If you accept the call, you are connected with the telephone where the baby monitor is enabled. A new call is initiated no less than one minute after the previous call. You can disable the baby monitor at any time by hanging up the headset.

Telephones on which baby monitoring is enabled can be called internally (see page 75) so that you can listen in on the room directly.

15.10 Making Telephone Calls with Convenience Functions

This chapter describes convenience functions you can use when placing and making telephone calls, for instance internal calling, forwarding calls, alternating between calls and three-party conferences.

Making Internal Calls

All calls conducted between telephones connected to the FRITZ!Box are internal telephone calls. Internal calls are free of charge.

Dialing Internal Calls	
☎	Pick up the handset.
✱✱‹internal telephone number›	Select ✱✱ and the internal telephone number of a telephone. **Internal telephone numbers:** Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629

Group Call

A group call is placed to all other telephones connected to the FRITZ!Box. You conduct the call with the party who picks up first.

Group Call	
☎	Pick up the handset.
✱✱9	Dial the sequence shown at left.

Transferring: Forwarding Calls Internally

You can transfer a call to another telephone connected with the FRITZ!Box.

Transferring Calls	
Call 1 ✆	You are talking to caller 1.
R	Press the Hold button. Caller 1 is now on hold.
****** ‹internal telephone number›	Call caller 2: Select ****** and the internal telephone number of a telephone. **Internal telephone numbers:** Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629
Call 2 ✆	You can now talk with caller 2.
⏉	To transfer call 1 to caller 2, simply hang up the receiver. Caller 1 and caller 2 will be connected to each other.

Shortening the Dialing Procedure

The FRITZ!Box automatically detects when the entry of a telephone number is complete. However, the FRITZ!Box needs a few seconds after entering the last numeral to detect this. You can shorten this delay:

Shortening the Dialing Procedure	
‹Telephone number› **#**	After entering the telephone number, press the **#** key. This signals to the FRITZ!Box that the entry of the telephone number is complete.

Three-party Conference Call

A three-party conference call can involve one other internal participant and one external participant, or two external participants.

Conducting a Three-party Conference Call	
☎	Pick up the handset.
⌨	Establish the call with party 1: Dial ✱✱ and an internal telephone number (see page 75) or dial an external telephone number. Talk.
R	Press the Hold button. Call 1 is on hold.
⌨	Call party 2. You can now conduct the second call while call 1 is on hold.
R3	Dial the sequence shown at left.
⚇	Now all parties can confer together. If either of the other two parties hangs up, your connection with the remaining participant remains active.
☎	To end the three-party conference call, hang up the handset.
R2	This keyboard shortcut ends the conference and re-connects you with the party you called before the conference began. The second call is on hold. You can alternate between the two parties by dialing the keypad sequence again.

Accepting or Rejecting Waiting Calls on an Analog Extension of the FRITZ!Box

When the “call waiting” function is switched on, you hear a signal whenever you receive an external call during an active telephone conversation. You can then accept the call within 30 seconds. If you do not accept the call, it will be rejected.

You can enable and disable the “call waiting” function in the FRITZ!Box user interface in the menu “Telephony / Telephony Devices”.

Accepting or Rejecting Waiting Calls on an Analog Extension	
R2	Use this keypad sequence to accept a waiting call. The first call is on hold. If you would like to end the first call, hang up the receiver. As soon as you have hung up your telephone will ring. When you pick up the receiver, you will be connected with the waiting call.
R1	If the first call was on hold, you can return to the first call using this keypad sequence.
R0	With this keypad sequence you can reject a waiting call.

Accepting Waiting Calls on Other Telephones

When making calls with a cordless DECT telephone registered on the FRITZ!Box, you can accept waiting calls using the telephone menu.

Alternating Between Calls

During a telephone call you can establish a connection to a second party. You can alternate between the two parties as often as you like.

Alternating Between Calls	
Call 1 ✆	You are talking with party 1.
R	Press the Hold (“R”) button.
▦	Call party 2. • Dial an external telephone number, • or dial ✪✪ and an internal telephone number. **Internal telephone numbers:** Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629
Call 2 ✆	When party 2 picks up the receiver the call has been established. The connection with party 1 is on hold.
R2	If you would like to return to the waiting party 1, dial the keypad sequence at left. With this keypad sequence you can alternate between the two parties as often as you like.

Ending Hold	
⏻	The waiting party hangs up and you continue the call with the other party.
R1	or You end the call with party 2 by dialing the keypad sequence at left. The conversation with party 1 is resumed.
⏻ 🔔 ✆	or You can end the active call by hanging up the handset. Your phone rings. As soon as you pick up the receiver you are connected with the waiting party.

Consultation / Hold

You can put a telephone call on hold in order to consult with another party. You call the second party. The party to the other call does not hear the consultation; after you are finished you can resume the call that was on hold.

Consultation / Hold	
Call 1 ✆	You are talking to caller 1.
R	Press the Hold button. Call 1 is on hold. Party 1 can no longer hear you.
#	Establish the connection to party 2: Dial an internal telephone number (see page 75) or an external telephone number.
Call 2 ✆	If party 2 accepts the call, you can conduct the conversation.
R	If party 2's line is busy or the call is not answered, press the Hold button again to return to call 1.
R1	Use this keypad sequence to return from call 2 back to call 1. Call 1 is now active again. If you only press the Hold button, the connection to caller 2 remains on hold until caller 2 hangs up. You can also end call 2 by hanging up the receiver. Your telephone rings and after you pick up the receiver again you will be connected with party 1.

Using Keypad Shortcuts

With keypad sequences you can control the services and features for your Internet telephone numbers.

For information about which keypad sequences you can use, contact your carrier.

Entering Keypad Sequences on an Extension with Automatic Outside Dialing	
☎	Pick up the handset.
✱#‹Seq›	Dial the sequence shown at left. ‹Seq› stands for a keyboard sequence.

Entering Keypad Sequences on an Extension without Automatic Outside Dialing	
☎	Pick up the handset.
0✱#‹Seq›	Dial the sequence shown at left. ‹Seq› stands for a keyboard sequence.

Automatic outside dialing is the default setting in the FRITZ!Box. If you make a lot of internal calls, you may want to disable automatic outside dialing. For instructions, see page 109.

16 FRITZ!Box as a DECT Base Station

A DECT base station is integrated in your FRITZ!Box, on which you can register and configure a total of up to six cordless telephones. This chapter describes various functions of the DECT base station.

16.1 Paging Cordless Telephones

If you have misplaced a cordless telephone, you can find it by using a paging call:

1. Briefly press the “DECT” button of the FRITZ!Box. All cordless telephones registered on the FRITZ!Box will ring.
2. To end the paging call press the “DECT” button on the FRITZ!Box again, or any button on your cordless telephone.

16.2 Deregistering a Cordless Telephone from the FRITZ!Box

For instructions on how to register a cordless telephone on the FRITZ!Box, see page 32.

1. Open the FRITZ!Box user interface (see page 25).
2. Click “DECT”.

   The “Cordless Telephones” page presents an overview of the registered cordless telephones.
3. Click the “Delete” button next to the cordless telephone to be deregistered.

The cordless telephone will be deregistered from the FRITZ!Box.

If you deregister all of the cordless telephones from the FRITZ!Box, the DECT function of the FRITZ!Box is switched off automatically.

16.3 Enabling DECT Eco

The DECT Eco function allows the FRITZ!Box to switch off the DECT network whenever all of the cordless telephones registered are on stand-by.

The connection between the FRITZ!Box and the cordless telephones remains active. You can place and accept calls at any time.

Prerequisite for Using DECT Eco

DECT Eco can be used only if all of the cordless telephones registered on the FRITZ!Box support DECT Eco.

To find out whether your cordless telephone supports DECT Eco, see the “DECT / DECT Monitor” menu in the FRITZ!Box user interface.

All of the latest FRITZ!Fon models by AVM support DECT Eco (see also AVM Products for the FRITZ!Box from page 119).

Enabling DECT Eco in the FRITZ!Box

1. Open the user interface of the FRITZ!Box in a web browser (fritz.box).
2. Select the “DECT / Base Station” menu.
3. Enable the “DECT Eco” option and define when DECT Eco should be active.
4. Click the “Apply” button to save the settings.
5. Register all of the cordless telephones on the FRITZ!Box again.

Now DECT Eco is enabled.

17 The FRITZ!Box Home Network

The FRITZ!Box connects your network devices in what we call a FRITZ!Box home network. In the home network the FRITZ!Box allows all connected users shared use of a printer, for instance.

Network Devices

- Network devices include, for instance, computers, game consoles and smartphones that are connected with the FRITZ!Box via a network cable connection or via WLAN.
- All network devices can access each other's folders released for sharing.

If you would like to learn more about the possibilities of network devices in your FRITZ!Box home network, continue reading in the chapter Network Devices in the FRITZ!Box Home Network from page 85.

18 Network Devices in the FRITZ!Box Home Network

All network devices connected with the FRITZ!Box comprise a network. Network devices include, for instance, computers, game consoles and smartphones. The devices can be connected with the FRITZ!Box by cable or wirelessly. This chapter describes the network settings in the FRITZ!Box and how you can change them. You will also learn how you can change the IP settings for the computer in the most common operating systems.

18.1 Network Settings in the FRITZ!Box

The FRITZ!Box is delivered with preconfigured network settings. According to these settings, all network devices connected with the FRITZ!Box are located in a single network.

The network settings can be changed and adapted to your conditions and needs. But you should do so only if you are well versed in networking technology.

The glossary (page 131) explains concepts and terminology having to do with IP networks.

Network Overview

The FRITZ!Box user interface shows an overview with all of the devices and users connected with the FRITZ!Box.

The network overview “Devices and Users” is found in the menu “Home Network / Network”.

- For each user and each network device, you find an entry in the network overview.
- If you use FRITZ!Powerline devices in your network, then the FRITZ!Powerline devices are entered in the network overview along with the network devices connected to the FRITZ!Powerline devices.
- The network overview is divided into the areas “Active Connections”, “Guest Network” and “Idle Connections”.

For each user and each network device, you find an entry in the network overview. The columns have the following meanings:

Icon	A green LED before the device name indicates that a device is actively connected with the FRITZ!Box, but not using the Internet connection at this time. A green-blue globe indicates that the device is currently using the Internet connection.
Name	This column displays the name under which the user or the network device is known to the FRITZ!Box. The names of network devices can be changed by clicking the button to edit the entry.
IP Address	For network devices, also displayed is the IP address with which the device is integrated into the FRITZ!Box network.
Connection	The WLAN icon is displayed for wireless connections.
Properties	This column indicates whether port forwarding or child protection is enabled for the respective user or network device.
	Button for editing the entry The button opens the entry in editing mode. This view displays information about the network device, for instance on child protection or port forwarding settings. The name of the device in the FRITZ!Box can be changed here.
	Button for deleting the entry Users or network devices that do not have an active connection to the FRITZ!Box can be deleted from the network overview by clicking this button.

Accessing Network Devices by Mouse Click

Network devices that can be reached over the http protocol can be accessed within the home network by the click of a mouse. Clicking the device name opens the user interface of the http application.

Always Assigning the Same IP Address

The editing mode for network devices includes the setting “Always assign this network device the same IP address”.

When this setting is enabled for a network device, the DHCP server of the FRITZ!Box will always assign the same IP address to this device each time the connection is established.

Starting the Computer—Wake on LAN

The Wake on LAN function of computers can be enabled in the editing mode for network devices. The computers must support Wake on LAN and be connected with the FRITZ!Box with a network cable. The Wake on LAN function is also available when the devices are connected via FRITZ!Powerline devices.

Wake on LAN is a function that allows a computer in the local network to be started when it is accessed from the Internet. For instance, you can access a computer using remote maintenance software, without wasting electricity by keeping the computer switched on permanently. The computer must be in standby operation.

The FRITZ!Box supports Wake on LAN both for IPv4 and for IPv6 connections.

- The “Start Computer” Button

  You can start the computer each time it is accessed over the Internet by clicking the “Start Computer” button.

- Starting Automatically

  To do this, enable the setting “Start this computer automatically as soon as it is accessed from the Internet”. When the computer is accessed from the Internet, it is started automatically.

IPv4 Settings in the FRITZ!Box

The IPv4 settings of the FRITZ!Box are preset upon delivery with the following values:

Factory Settings	
IPv4 address	2.168.178.1
Subnet mask	255.255.255.0
DHCP server	enabled

The IP address and the corresponding subnet mask yield the following values:

Network address of the subnet	192.168.178.0
Entire IPv4 address range for the computers	192.168.178.2 - 192.168.178.254

The following IPv4 addresses cannot be assigned because they are reserved for certain purposes:

This IP address is used by the FRITZ!Box itself	192.168.178.1
This IP address is the broadcast address used to send messages into the network	192.168.178.255

IPv4 Address in the FRITZ!Box

Upon delivery the FRITZ!Box is assigned the following IPv4 address:

192.168.178.1

If you would like to change the IPv4 address, please read through the following sections.

When Does It Make Sense to Change the IPv4 Address?

You should change the IPv4 address of the FRITZ!Box if the following apply to your network:

- You have an existing local IPv4 network, one subnet with several computers.

- Fixed IPv4 addresses are registered in the network settings of the computer, and you do not want to or are not permitted to change these addresses.
- You want to connect the FRITZ!Box to the local IPv4 network in order to make the FRITZ!Box features available to all of the computers in the IPv4 network.

Reserved IP Addresses

The entire IP network 192.168.180.0 in the FRITZ!Box is reserved for internal purposes.

IPv4 addresses from this network may **not** be assigned to the FRITZ!Box.

DHCP Server for IPv4

The FRITZ!Box is equipped with its own DHCP server for the IPv4 network. The DHCP server is enabled by default in the factory settings. The following range of IP addresses is reserved for the DHCP server in the factory settings:

192.168.178.20 - 192.168.178.200

This IP address can be changed as needed.

Every time the operating system on a computer connected with FRITZ!Box is started, the DHCP server assigns it an IPv4 address from the IP address range of the DHCP server.

Only one DHCP server may be active within any network.

Assigning the IP addresses via the DHCP server ensures that all of the computers connected with the FRITZ!Box are located in the same IP network.

The computers can receive their IPv4 addresses from the DHCP server only if the setting “Obtain an IPv4 address automatically” is enabled in the their IP settings. For more information, see the section Obtaining an IP Address Automatically from page 93.

Fixed IPv4 Addresses When the DHCP Server Is Enabled

If you would like to configure fixed IPv4 addresses on individual computers connected with the FRITZ!Box despite the enabled DHCP server, please note the following:

- The IPv4 addresses must be from the IPv4 network of the FRITZ!Box.
- The IPv4 addresses may not come from the address range of the DHCP server.
- Each IPv4 address can be assigned only once.

Disabling the DHCP Server

You can disable the DHCP server.

To make sure that all computers remain in the same IP network when the DHCP server is disabled, you must enter the IPv4 addresses manually in the computers' network settings. First disable the option "Obtain an IP address automatically" and then enter the IP address manually in the appropriate field.

In the case of the preset IPv4 address of the FRITZ!Box, the following IPv4 addresses are available for assignment to the computers:

192.168.178.2 - 192.168.178.254

Here too: each IPv4 address can be assigned only once.

Changing Network Settings

1. Enable the advanced view in the user interface.
2. Select the “Home Network / Network” menu.
3. Select the “Network Settings” page.
4. Click the “IPv4 Addresses” or “IPv6 Addresses” button, depending on the address range you would like to change.

Please note that changes to the network settings in the FRITZ!Box may make it necessary to adjust the network settings of your computers so that you can continue to access the FRITZ!Box user interface.

IPv6 Settings in the FRITZ!Box

The following settings options for IPv6 are found in the advanced view in the “Home Network / Network” menu on the “Network Settings” page.

Additional IPv6 Routers in the Home Network

- IPv6 prefixes from other IPv6 routers

  You can allow the network devices connected to the FRITZ!Box to receive IPv6 prefixes announced by other IPv6 routers in the local network.

- Also announce DNSv6 server via router advertisement

  With this setting you specify that the FRITZ!Box announces the local DNSv6 server in the local network via router advertisement. Alternatively, the network devices can identify the local DNSv6 server via DHCPv6.

IPv6 Settings

Click the “IPv6 Addresses” button to configure settings for the IPv6 addresses in the local network.

Unique Local Adresses

The communication within the local network takes place via the Unique Local Addresses (ULA). If no IPv6 Internet connection is established, the network devices do not have a ULA and communication between them is restricted. For this case you can set the FRITZ!Box such that the network devices receive the ULA from the FRITZ!Box.

DHCPv6 Servers in the Home Network

The FRITZ!Box is equipped with its own DHCPv6 server. The DHCPv6 server of the FRITZ!Box is switched on by default.

The DHCPv6 server assigns the network devices their IPv6 settings. These settings are used instead of the data in the router advertisement messages. The DNS server, IPv6 prefixes or IPv6 addresses can all be assigned by DHCPv6. Define which IPv6 settings should be assigned by the DHCPv6 server.

UPnP Settings

The Universal Plug-and-Play (UPnP) service included in your FRITZ!Box provides status information about the FRITZ!Box to all connected computers. Programs with UPnP support on these computers can receive this information and use them to display the status of the FRITZ!Box (e.g., connection status, data transmission). UPnP service thus allows you to monitor your FRITZ!Box from a connected computer.

Here is how to change the UPnP settings:

1. Open the FRITZ!Box user interface (see page 25).
2. Enable the advanced view.
3. Configure the UPnP settings in the “Home Network / Network” menu on the “Programs” page.

18.2 Obtaining an IP Address Automatically

The FRITZ!Box has its own DHCP server, which assigns IP addresses to the connected computers. The connected computers must be configured such that they can receive their IP addresses automatically. The steps for checking and adjusting this option differ among the operating systems. See the relevant section for your operating system.

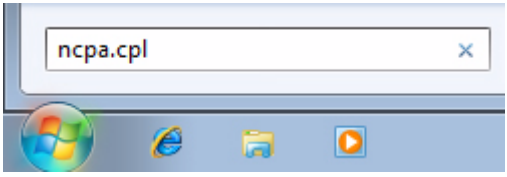
If FRITZ!Box is operated in a network, no other DHCP server may be activated in this network.

Obtaining an IP Address Automatically in Windows

1. Open the network connections:

   Windows 7 and **Windows Vista**: Click “Start”, enter “ncpa.cpl” in the search line of the start menu, and press “Enter”.

   Windows XP: Select “Start / Run”, enter “ncpa.cpl” and then click “OK”.

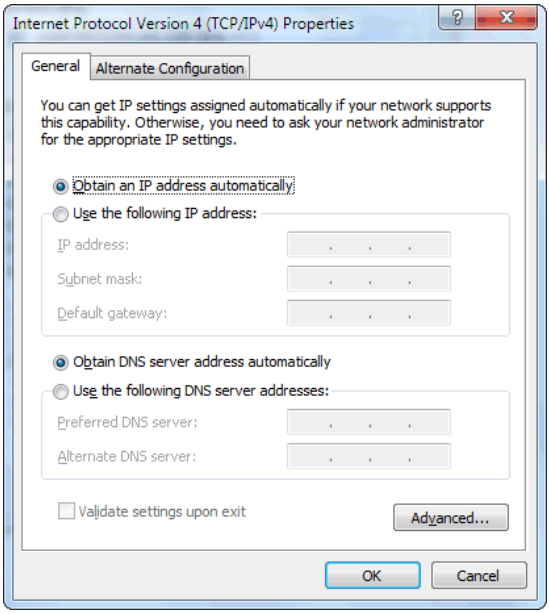


Entering “ncpa.cpl” in Windows 7

2. Click the network connection between the computer and the FRITZ!Box with the right mouse button and select “Properties”.
3. **Windows 7** and **Windows Vista**: Under “This connection uses the following items”, select “Internet Protocol Version 4 (TCP/IPv4)”.

   Windows XP: Under “This connection uses the following items”, select “Internet Protocol (TCP/IP)”.
4. Click the “Properties” button.

5. On the “General” tab, enable the options “Obtain an IP address automatically” and “Obtain DNS server address automatically”.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

6. Click “OK” to save the settings.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Mac OS X

1. Select the “System Preferences...” in the Apple menu.
2. In the “System Preferences” window, click the “Network” icon.
3. In the “Network” window, select the “Built-in Ethernet” entry from the list. Click the “Advanced...” button.
4. The “TCP/IP” settings page opens. Select the “Using DHCP” option from the “Configure IPv4:” drop-down list.
5. Click “OK”.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Linux

For comprehensive information and tips on the topic of network settings in Linux, see, for example:

tldp.org/HOWTO/NET3-4-HOWTO-5.html

19 Help in Case of Errors

This chapter provides assistance if you are not able to open the user interface of your FRITZ!Box or are having problems with the WLAN connection.

For more comprehensive help, see the AVM knowledge database in the Internet, which can be accessed at the following address:

service.avm.de/support/en/skb

19.1 The User Interface Does Not Open

If an error message is returned when you open the FRITZ!Box user interface, this can have various causes. Check the causes listed below and attempt to resolve the error.

Restarting the FRITZ!Box

The user interface cannot be opened or does not react.

Cause

Inconsistencies within the FRITZ!Box.

Help

1. Restart the FRITZ!Box.

   Remove the power cable from the socket.

2. Wait about five seconds before reconnecting to the power supply.

3. To make sure that the FRITZ!Box has finished restarting, wait until the “Power/LTE” LED lights up and stops flashing and, if you have switched on WLAN, the “WLAN” LED remains lit up as well. This ensures that the FRITZ!Box restart has been completed.

4. Try again to open the FRITZ!Box user interface by entering fritz.box in the address field.

Checking the Cable Connections

The FRITZ!Box user interface is not displayed in your web browser.

Cause

The cable connections are not secure.

Help

Make sure that all cables are plugged in securely.

Checking the Name Resolution

The user interface of the FRITZ!Box cannot be opened by entering fritz.box.

Cause

The name resolution of the FRITZ!Box does not work.

Help

1. In the web browser, enter the following IP address in place of fritz.box:

   192.168.178.1

2. If the user interface opens in response to this address, set the network adapters of your computer to “Obtain the IP address automatically” (see page 93).

Checking the IP Address

The user interface of the FRITZ!Box cannot be opened by fritz.box nor by entering 192.168.178.1.

Cause

Incorrect IP address on the connected computer.

Help

Set the computer’s network adapter to DHCP so that the network adapter can obtain its IP address from the DHCP server of the FRITZ!Box. See the section Obtaining an IP Address Automatically from page 93 for instructions.

If you still cannot open the user interface by entering fritz.box or by 192.168.178.1, use the fixed IP address of the FRITZ!Box as described on page 100.

Disabling Dial-up Connections

The user interface is not opened; a window for a dial-up connection appears instead.

Cause

The browser must use the network connection between the computer and FRITZ!Box when the user interface is opened. For this the automatic establishment of a Dial-Up Networking connection must be disabled.

Help

You can disable the automatic attempt to establish a Dial-up Networking connection. The following example explains how to check the settings of Internet Explorer 8:

1. Select the “Connections” settings page under “Tools / Internet Options”.
2. In the “Dial-up and Virtual Private Network settings” section, enable the option “Never dial a connection”.
3. As a final step, click “OK”.

Disabling Online Operation

The user interface does not appear in the window of your web browser.

Cause

The web browser is set for offline operation.

Help

Configure the web browser for online operation. Using the example of Internet Explorer 8:

1. Open the “Tools” menu.
2. If a checkmark is displayed in front of “Work Offline”, click this line.

The checkmark will be removed and Internet Explorer will switch to online operation.

Checking the Proxy Settings

The user interface does not appear in the window of your web browser.

Cause

The proxy settings of the web browser prevent the user interface from being opened.

Help

Enter the DNS name and the IP address of the FRITZ!Box as an exception in the proxy settings of the web browser, as described here for the example of the Internet Explorer 8.

1. Select the “Connections” settings page under “Tools / Internet Options”.
2. Click the “LAN settings” button in the “Local Area Network (LAN) settings” area.
3. In the “Proxy server” area of the next window, check the “Use a proxy server for your LAN” option and then click “Advanced”.
4. Enter as “Exceptions”:

   fritz.box; 192.168.178.1; 169.254.1.1

   and click “OK”.

Checking the Security Software

The user interface cannot be displayed in the web browser.

Cause

Security software is blocking access to the user interface.

Help

Security software like firewalls can prevent access to the user interface of the FRITZ!Box. Configure exceptions for the FRITZ!Box in all of the enabled security software.

Opening the User Interface Using the Fixed IP Address

The FRITZ!Box has a fixed IP address that cannot be changed. The FRITZ!Box always can be reached at this IP address.

Fixed IP address	169.254.1.1

Proceed as follows to open the FRITZ!Box user interface using this IP address:

1. Connect a computer to the FRITZ!Box with a network cable (see page 17).
2. Make sure that the computer obtains its IP address automatically (see page 93.
3. Start your Internet browser and enter the FRITZ!Box's fixed IP address: 169.254.1.1

   The FRITZ!Box user interface opens.
4. Check the IP settings of the FRITZ!Box and correct them if necessary.

19.2 Cannot Establish a WLAN Connection

If you are not able to establish a WLAN connection between your computer and the FRITZ!Box, then please undertake the following measures to seek the source of the error and resolve it.

Enabling the WLAN Device

The WLAN device cannot find a wireless network.

Cause
The WLAN device is not ready for operation.

Help
Make sure that the WLAN device is ready for operation. Some of the WLAN devices installed in notebooks must be activated by flipping a switch on the notebook.

For questions on the WLAN device of your computer, please contact the manufacturer.

Enabling WLAN

The WLAN device cannot find the radio network of the FRITZ!Box.

Cause

WLAN is switched off in the FRITZ!Box. The “WLAN” LED on the FRITZ!Box is off.

Help

Press the “WLAN” button on the FRITZ!Box. The “WLAN” LED begins flashing. As soon as the “WLAN” LED stops flashing and stays lit, the WLAN function of the FRITZ!Box is enabled.

Announcing the Name of the Radio Network

The WLAN device cannot find the wireless network of the FRITZ!Box.

Cause

The name of the wireless network of the FRITZ!Box is concealed.

Help

1. Connect a computer to the FRITZ!Box with a network cable (see page 17).
2. Open the FRITZ!Box user interface (see page 25).
3. Select “WLAN / Radio Network”.
4. Enable the option “Name of the radio network visible”.
5. Click the “Apply” button.
6. Remove the network cable and try again to establish a connection via WLAN.

Checking the Security Settings for WLAN

Make sure that the WLAN security settings of the FRITZ!Box agree with the security settings of the WLAN adapter.

The WLAN security settings of the FRITZ!Box are found in the user interface:

1. Connect a computer to the FRITZ!Box with a network cable (see page 17).
2. Open the FRITZ!Box user interface (see page 25).
3. Select “WLAN / Security”.
4. Click the “Apply” button.

   A window is displayed with the WLAN security settings. You can print out these settings by clicking the “Print Page” button.

Testing a Non-Encrypted WLAN Connection

Test whether a non-encrypted WLAN connection between the FRITZ!Box and the WLAN adapter is possible.

1. Connect a computer to the FRITZ!Box with a network cable (see page 17).
2. Open the FRITZ!Box user interface (see page 25).
3. Select “WLAN / Security”.
4. Enable the “non-encrypted” option.
5. Click the “Apply” button.
6. Remove the network cable and try again to establish a connection.

Disable WLAN encryption only for testing. Enable WLAN encryption right away after completing the tests.

If you cannot establish a non-encrypted WLAN connection, make sure that the WLAN adapter in your computer is installed correctly. If the error cannot be remedied, contact the manufacturer of the WLAN adapter.

Installing the Current Service Pack for Windows XP

The WLAN connection to the FRITZ!Box cannot be established using the Microsoft WLAN Service (WZC: Windows Zero Configuration) in Windows XP with Service Pack 2.

Cause

The required Microsoft patch for WPA2 (IEEE 802.11i) may not be not installed.

Help

Install Service Pack 3 (SP3) for Windows XP, available as a free download from Microsoft. Then Microsoft WLAN Service will support WPA2, so that a WLAN connection can be established to the FRITZ!Box.

Ruling Out Interference from Other Wireless Networks

If there are other devices in the immediate vicinity of your FRITZ!Box that use the same frequency band, mutual interference and interrupted connections can occur. Devices that can cause disruptions include other WLAN base stations, baby monitors, game consoles, garage door openers, Bluetooth devices, or wireless AV bridges, which also use the 2.4-GHz frequency band.

If such devices are located in the vicinity of the FRITZ!Box, test a different radio channel for the FRITZ!Box or switch the radio channel setting to “Autochannel”. Then the FRITZ!Box will automatically set the best WLAN channel for transmission.

1. Connect a computer to the FRITZ!Box with a network cable (see page 17).
2. Open the FRITZ!Box user interface (see page 25).
3. Select “WLAN / Radio Channel”.
4. Set a different radio channel or automatic radio channel selection.
5. Click the “Apply” button.
6. Remove the network cable and check whether interference continues to occur.

20 Configuring FRITZ!Box on the Telephone

Various functions can be enabled and disabled using a telephone connected to the FRITZ!Box. You can also restore the factory settings of the FRITZ!Box using a telephone. Only tone-dialing (dual-tone multifrequency: DTMF) telephones can be used for configuration.

20.1 Loading Factory Settings

When the factory settings are restored to the FRITZ!Box, all of the settings in the FRITZ!Box are returned to their condition upon delivery.

All settings you made in the FRITZ!Box are deleted when the factory settings are loaded. This is also true for the configured Internet connection.

Loading Factory Settings	
#991*15901590*	Restores the settings in the FRITZ!Box to the factory settings.

After factory settings are restored, the FRITZ!Box is restarted.

20.2 Switching WLAN On and Off

The WLAN function of your FRITZ!Box can be switched on and off using a connected telephone.

Switching WLAN On and Off	
#96*1*	Switches the WLAN function on.
#96*0*	Switches the WLAN function off.

20.3 Switching the Alarm On and Off

You can use the telephones connected to the FRITZ!Box as alarms. The alarm can be set individually and enabled or disabled at any time.

Configuring the Alarm for a Telephone	
☎	Pick up the handset.
✱881✱‹time›✱ ‹internal telephone number›✱	Defines the time at which the telephone with the specified internal telephone number will ring. For instance, enter ✱8810✱0700✱1✱ if the telephone on the “FON 1” socket should ring at 07:00 a.m. **Internal telephone numbers:** Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629
✱91✱✱	Save your settings.
☎	Hang up the handset.

Enabling the Alarm	
☎	Pick up the handset.
✱881✱✱	Enable the alarm function.
✱91✱✱	Save your settings.
☎	Hang up the handset.

Disabling the Alarm	
☎	Pick up the handset.
✱881#	Disable the alarm.
✱91✱✱	Save your settings.
☎	Hang up the handset.

20.4 Setting Up Call Diversion

With call diversion you can divert incoming calls. The calls are diverted to an external telephone line or to a certain telephone connected with your FRITZ!Box.

If your telephony provider supports direct diversion of incoming calls, calls will be diverted by your provider. Otherwise the FRITZ!Box establishes a second connection to divert the call. In either case, call diversion to an external line will be charged at your contracted telephone rates.

Configuring Call Diversion for All Calls

You can set up call diversion for all incoming calls.

For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

Configuring Call Diversion for All Incoming Calls	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱21✱‹DNo›✱#	Configures immediate call diversion to the destination number ‹DNo›.
✱61✱‹DNo›✱#	Configures delayed call diversion (after 20 seconds) to the destination number ‹DNo›.
✱67✱‹DNo›✱#	Configures call diversion on busy to the destination number ‹DNo›. Calls will be diverted when the telephone number called is busy.
•••	Wait for the positive acknowledgement tone.
☎	Hang up the handset.

Disabling Call Diversion for All Incoming Calls	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱2100✱#	Disables immediate call diversion.
✱6100✱#	Disables delayed call diversion.
✱6700✱#	Disables call diversion on busy.
•••	Wait for the second-long positive acknowledgement tone.
☎	Hang up the handset.

Configuring Call Diversion for Outgoing Telephone Numbers

You can set up call diversion for all calls that arrive for the outgoing number of the telephone.

For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

Configuring Call Diversion for Outgoing Telephone Numbers	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱21✱‹DNo›#	Configures immediate call diversion to the destination number ‹DNo›.
✱61✱‹DNo›#	Configures delayed call diversion (after 20 seconds) to the destination number ‹DNo›.
✱67✱‹DNo›#	Configures call diversion on busy to the destination number ‹DNo›.
•••	Wait for the second-long positive acknowledgement tone.
☎	Hang up the handset.

Disabling Call Diversion for the Outgoing Telephone Number	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱21✱#	Disables immediate call diversion.
✱61✱#	Disables delayed call diversion.
✱67✱#	Disables call diversion on busy.
•••	Wait for the second-long positive acknowledgement tone.
☎	Hang up the handset.

Configuring Call Diversion for a Certain Telephone Number

You can set up call diversion for all calls that arrive for a certain telephone number.

For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

Configuring Call Diversion for a Certain Telephone Number	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱21✱‹DNo› ✱‹telephone number›#	Configures immediate call diversion for the telephone number entered to the destination number ‹DNo›.
✱61✱‹DNo› ✱‹telephone number›#	Configures delayed call diversion (after 20 seconds) for the telephone number entered to the destination number ‹DNo›.
✱67✱‹DNo› ✱‹telephone number›#	Configures call diversion on busy for the telephone number entered to the destination number ‹DNo›.
•••	Wait for the second-long positive acknowledgement tone.
☎	Hang up the handset.

Disabling Call Diversion for a Certain Telephone Number	
☎	Pick up the handset.
	Enter one of the following three keypad sequences:
✱21✱✱‹telephone number›#	Disables immediate call diversion.
✱61✱✱‹telephone number›#	Disables delayed call diversion.
✱67✱✱‹telephone number›#	Disables call diversion on busy.
•••	Wait for the second-long positive acknowledgement tone.
☎	Hang up the handset.

20.5 Disabling Automatic Outside Dialing

When automatic outside dialing is disabled, for an external call the 0 must be dialed before the telephone number.

21 Taking FRITZ!Box out of Operation

In this chapter you receive tips and recommendations for taking the FRITZ!Box out of operation.

Please also follow our instructions for the correct disposal of waste equipment on page 130.

21.1 Removing the SIM Card

If you want to end operation of the FRITZ!Box, remove the SIM card from the slot.

21.2 Restoring Factory Settings

When the factory settings are restored to the FRITZ!Box, all of the settings in the FRITZ!Box are restored to their condition upon delivery. This is strongly recommended if you are planning to pass the FRITZ!Box on to another user.

Resetting the FRITZ!Box has the following effects:

- All settings you made in the FRITZ!Box will be deleted.
- The factory settings' WLAN key will be activated again.
- The IP configuration of the factory settings will be restored.

Saving the FRITZ!Box Settings

Before loading the factory settings, save all of the settings you made in your FRITZ!Box to a backup file. With this backup file you can restore your settings to the FRITZ!Box at any time or load them to another FRITZ!Box.

Instructions for saving, restoring and applying the FRITZ!Box settings are presented in the Online Help of the user interface.

Loading Factory Settings

1. In the FRITZ!Box user interface, select the "System / Reset" menu.
2. Select the "Factory Settings" tab.

3. Click the “Load Factory Settings” button.

The FRITZ!Box is reset to its factory settings.

21.3 Uninstalling Software

Additional software for the FRITZ!Box is available on the web pages of AVM at avm.de/en/download.

If you have installed supplementary programs on one or more computers, uninstall the software using the control panel of your Windows operating system.

Uninstalling Software in Windows 7

1. Open “Start / Control Panel / Programs”.
2. Under “Programs and Features”, click “Uninstall a program”.
3. Select in the list the AVM software to be uninstalled.
4. Click the “Uninstall/Change” button.

The software will be removed.

Uninstalling Software in Windows Vista

1. Open “Start / Settings / Control Panel / Programs and Functions”.
2. Select in the list the AVM software to be uninstalled.
3. Click the “Uninstall/Change” button and confirm with “Continue”.

The software will be removed.

Uninstalling Software in Windows XP

1. Open “start / Control Panel / Add or Remove Programs”. Make sure that the “Change or Remove Programs” button is selected in the column at left.
2. Select the AVM software to be uninstalled from the list of “Currently installed programs”.
3. Click the “Change/Remove” button.

The software will be removed.

22 Technical Specifications

Facts worth knowing: Here you will find comprehensive technical data on your FRITZ!Box 6810 LTE.

22.1 Ports and Interfaces

- LTE modem compliant with 3GPP standard, release 8 LTE category 3 UE
- LTE frequency bands
  - LTE band 20: 791 - 862 MHz (digital dividend)
  - LTE band 7: 2500 - 2690 MHz
- DECT base station
- One LAN port over RJ45 socket (standard Ethernet, 10/100 Base-T)
- WLAN base station with support for wireless networks in the 2.4-GHz frequency band
  - IEEE 802.11b – 11 Mbit/s
  - IEEE 802.11g – 54 Mbit/s
  - IEEE 802.11n – 300 Mbit/s

22.2 Router Functions

- Router
- DHCP server
- Firewall with IP masquerading/NAT
- IPv4 and IPv6
- Child protection and filter lists
- Port forwarding
- Dynamic DNS
- VPN

22.3 User Interface and Display

- Configuration and status messages via a web browser on a connected computer
- Five LEDs indicate the condition of the device

22.4 Physical Specifications

- Dimensions (W x D x H): ca. 64 x 99 x 134 mm
- Supply voltage: 230 V / 50 Hz
- Maximum power consumption: 8 W
- FRITZ!OS can be updated
- Conforms to CE standards
- Ambient conditions
  - operating temperature: 0 °C to +40 °C
  - storage temperature: -20 °C to +70 °C
  - relative humidity (operation): 10% – 90%
  - relative humidity (idle): 5% – 95%

22.5 Cable

Network Cable

The network cable (white) of the FRITZ!Box 6810 LTE is a standard category 5 (Cat 5) Ethernet cable. Please use a standard STP-type (Shielded Twisted Pair) Ethernet cable of category 5 (Cat 5) to replace or extend the Ethernet cable. To extend the cable you will need a shielded RJ45 double coupling (Cat 5) with a 1:1 pin assignment. You can use both straight cables and crosslink cables. All components are available from specialized vendors.

When components of a category smaller than Cat 5 are used, reduced transmission rates may result.

AVM recommends using a network cable no more than 100 meters long.

23 Customer Service

Be it product documentation, frequently asked questions, tips or support: this chapter presents information on all important service topics.

23.1 Documentation on the FRITZ!Box

To take advantage of all commands and features of your FRITZ!Box, consult the following documentation:

Help

In the FRITZ!Box user interface you can open the comprehensive Online Help by clicking the “Help” icon and the “Help” buttons.

Manual

The PDF file of the manual can be opened and downloaded from the Internet at the following address:

avm.de/en/service/manuals

Choose the “FRITZ!Box” product group and then your “FRITZ!Box 6810 LTE”. The PDF is opened.

The current Adobe Acrobat Reader for reading PDF documents can be downloaded from the Internet free of charge at adobe.com.

23.2 Information in the Internet

On its web site AVM presents comprehensive information on your AVM product.

Videos on the FRITZ!Box

Videos on many of the FRITZ!Box functions are available, showing animated demonstrations of how to set up the individual functions.

The videos can be viewed at the following address:

avm.de/en/service/FRITZ_Clips

AVM Knowledge Base

We would like to make our products as easy to use as possible. If you still have problems, sometimes you need just a tip to resolve them.

In our AVM knowledge base you find immediately help and answers to your questions in easy dialogs. In a guided navigation we provide for customized solutions. You find the AVM knowledge base on the AVM Internet pages in the “Service” area:

service.avm.de/support/en/skb

23.3 Feedback on FRITZ!Box

In various places in the user interface, the FRITZ!Box offers you the opportunity to send your concrete feedback to AVM. Your feedback helps us to continually improve the FRITZ!Box.

When you submit your feedback, only the technical data and **no personal data** are transmitted to AVM. These data are used for the exclusive purpose of product improvement. A corresponding message appears in the Event Log, stating that the error report was sent to AVM.

Automatically Sending Error Reports to AVM

In the case of serious errors, this service generates a report on the problem that occurred and automatically sends this error report to AVM. The error report helps improve the stability of the FRITZ!OS.

Settings options for automatically sending error reports are located in on the “Contents / AVM Services” page of the FRITZ!Box user interface.

Evaluating the WLAN Connection

On the “WLAN / Radio Network / Known WLAN Devices / Feedback” page you can evaluate your satisfaction with the WLAN connection between the FRITZ!Box and the wireless device. This information helps AVM optimize the WLAN properties of the FRITZ!Box.

Evaluating the Voice Quality of Internet Calls

In the “Advanced View” of the FRITZ!Box, the “Telephony / Own Telephone Numbers / Voice Transmission” page offers you the opportunity to evaluate the quality of a call conducted over the Internet. Your evaluation will help us continue to improve the quality of voice transmission in Internet calls made over the FRITZ!Box.

The contents of the call and numbers participating will not be transmitted to AVM.

23.4 Support from the Support Team

Should problems with your FRITZ!Box arise, we recommend taking the following steps:

1. If you have questions about starting operation of your FRITZ!Box, please consult the following chapters again:
   - Before You Connect the FRITZ!Box from page 12
   - Connecting the FRITZ!Box from page 15
   - Connecting the Computer to the FRITZ!Box from page 17
2. If you have any problems, seek first aid by consulting the chapter Help in Case of Errors from page 96.

   This chapter also presents tips on problems with establishing connections.
3. Read our tips from the AVM Knowledge Base in the “Service” area.

   service.avm.de/support/en/skb

   This site contains answers to questions our customers have frequently asked our Support team.

Please take advantage of the information sources described above before contacting AVM support.

Support by E-mail

You can send us an English-language e-mail request at any time using the “Service” area of our web site. The “Service” area can be reached at:

avm.de/en/service

1. Select the product group and your product for which you need support from the “Support” area.

   You will receive a selection of FAQs.

2. If you need more help, click the “Contact support” button to open the e-mail support form.

3. Fill out the form and send it to AVM by clicking the “Submit support request”.

Our Support team will respond by e-mail as quickly as possible.

23.5 Manufacturer's Warranty

We offer a manufacturer's warranty of 5 years on the hardware of this original product. The warranty period begins with the purchase date from the first end user. Compliance with the warranty period can be proven by submission of the original invoice or comparable documents. This warranty does not restrict your warranty rights based on the contract of sale or other statutory rights.

Within the warranty period, we will remove defects to the product which are demonstrably due to faults in materials or manufacturing. Our warranty does not cover defects which occur due to incorrect installation, improper use, non-observance of instructions in the user manual, normal wear and tear or defects in the environment of the system (third-party hardware or software). We may, at our discretion, repair or replace the defective product. Claims other than the right to the removal of defects which is mentioned in these terms of warranty are not constituted.

We guarantee that the software conforms with general specifications, not, however, that the software meets your individual requirements. Delivery costs will not be reimbursed. Products which have been replaced revert to our ownership. Claims recognized under warranty entail neither an extension or recommencement of the warranty period. If we reject a warranty claim, this claim lapses no later than six months after being rejected by us.

This warranty shall be governed by German substantive law, to the exclusion of the United Nations Convention on Contracts for the International Sale of Goods (CISG).

24 AVM Products for the FRITZ!Box

Here we introduce additional devices by AVM that are designed to be used in combination with your FRITZ!Box 6810 LTE.

FRITZ!Powerline 520E

LAN
Powerline
Power outlet

With FRITZ!Powerline 520E your electrical outlet is transformed into a secure network line. And the power outlet can still be used to plug in devices. Just connect your devices over the power line—without installing any cables:

- Networks FRITZ!Powerline 520E, computer, printer, TV, stereo, game console, media player and other network devices
- Especially suitable for broadband-intensive use like streaming, surfing, gaming, Internet TV, video on demand and VoIP
- Throughput of up to 500 Mbit/s over a range of up to 500 meter over your own power mains
- Low operating power consumption, under 1 W on standby
- With an integrated outlet—you have just as many electrical outlets available for use
- Encrypted securely upon delivery with 128-bit AES
- Available in a practical set with two adapters; additional adapters can be networked easily and securely at the touch of a button

For more information, see
avm.de/en/Produkte/FRITZPowerline/FRITZPowerline_520E.

FRITZ!Powerline 500E

LAN

Powerline

With FRITZ!Powerline 500E your electrical outlet is transformed into a secure network line. Just connect your devices over the power line—without installing any cables:

- Networks FRITZ!Powerline 500E, computer, printer, TV, stereo, game console, media player and other network devices
- Especially suitable for broadband-intensive use like streaming, surfing, gaming, Internet TV, video on demand and VoIP
- Throughput of up to 500 Mbit/s over a range of up to 500 meter over your own power mains
- Low operating power consumption, under 1 W on standby
- Encrypted securely upon delivery with 128-bit AES
- Immediately operational at every outlet
- Immediately ready for operation without any software installation
- Available in a practical set with two adapters; additional adapters can be networked easily and securely at the touch of a button

For more information, see avm.de/en/Produkte/FRITZPowerline/FRITZPowerline_500E.

FRITZ!WLAN USB Stick N

Up to 300 Mbit/s
Dual band
WPA2 (802.11i)
Stick & Surf

FRITZ!WLAN USB Stick N connects your computer easily and safely with your FRITZ!Box WLAN and other compatible WLAN routers:

- USB stick for WLAN N with up to 300 Mbit/s
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Supports the conventional standards 802.11n/g/b/a
- WPA2 encryption for maximum WLAN security (802.11i)
- Stick & Surf: secure wireless network without configuration
- Supports WPS for easy, fast configuration of secure WLAN connections

For more information, see avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_USB_Stick_N.

FRITZ!WLAN USB Stick

Up to 150 Mbit/s
WPA2 (802.11i)
Stick & Surf

FRITZ!WLAN USB Stick connects your computer easily and safely with any WLAN router:

- USB stick for WLAN N with up to 150 Mbit/s
- Supports the WLAN standards 802.11n/b/g
- WLAN support for 2.4-GHz connections
- WPA2 encryption for maximum WLAN security (802.11i)
- Stick & Surf: secure wireless network without configuration
- Supports WPS for easy, fast configuration of secure WLAN connections

For more information, see avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_USB_Stick/.

FRITZ!WLAN Repeater 300E

Up to 300 Mbit/s
WPS
Gigabit LAN

With the FRITZ!WLAN Repeater 300E the range of the wireless network can be conveniently extended:

- Compatible with all conventional WLAN routers (802.11n/g/b/a radio standards)
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Simple configuration at the click of a button via WPS, using a Wizard or manually
- Integrated gigabit LAN interface provides for simple integration of network devices into the home network or the Internet

For more information, see avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_300E.

Up to 300 Mbit/s
WPS

With the FRITZ!WLAN Repeater 310 the range of the wireless network can be conveniently extended:

- Compatible with all conventional WLAN routers (802.11n/g/b/a radio standards)
- WLAN support for 2.4-GHz conections
- Simple configuration at the click of a button, via WPS or using a Wizard
- Small and very compact: designed for operation at any 230-V outlet

For more information, see avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_300E.

FRITZ!WLAN Repeater N/G

Up to 300 Mbit/s
WPS
Media function

With the FRITZ!WLAN Repeater N/G the range of the wireless network can be extended quickly and easily:

- Compatible with all conventional WLAN routers (802.11n/g/b/a radio standards)
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Simple configuration at the click of a button via WPS, using a Wizard or manually
- Media function: integrated audio output and miniature FM transmitter for transferring music or web radio to stereo/radio

For more information, see avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_N_G.

FRITZ!Fon MT-F

HD telephony
Color display
Web radio
Reading e-mail

FRITZ!Fon MT-F is a convenient cordless telephone (DECT) developed especially for the FRITZ!Box:

- Supports HD telephony for natural sound, full duplex hands-free calls and open listening in HD quality
- Voice transmission encrypted upon delivery for greater security
- Intuitive menus on a large color display
- Receive RSS feeds, web radio and podcasts, and read and answer e-mail
- Battery talk time up to 10 hours, up to 6 days on stand-by
- Update with new functions at the press of a button

For more information, see avm.de/en/Produkte/FRITZFon/FRITZFon_MT-F.

FRITZ!Fon M2

HD telephony
Web radio
Reading e-mail

FRITZ!Fon M2 is an ergonomically designed cordless telephone (DECT) developed especially for the FRITZ!Box:

- Supports HD telephony for natural sound, full duplex hands-free calls and open listening in HD quality
- Voice transmission encrypted upon delivery for greater security
- Range up to 300 meters outdoors and up to 40 meters indoors
- Receive RSS feeds, web radio and podcasts, and read and answer e-mail
- Battery talk time up to 15 hours, up to 10 days on stand-by
- Update with new functions at the press of a button
- Ergonomically designed, illuminated keypad with notification key, and clear intuitive menus on a monochrome display

For more information, see avm.de/en/Produkte/FRITZ-Fon/FRITZFon_M2.

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Legal Notice

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Declaration of CE Conformity

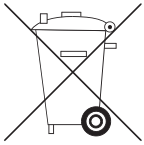
AVM declares herewith that the device is compliant with the basic requirements and the relevant rules in directives 1999/5/EC or 2004/108/EC and 2006/95/EC, 2009/125/EC and 2011/65/EU.

The declaration of CE conformity is available at http://en.avm.de/ce.

Disposal Information

In accordance with European regulations, the FRITZ!Box 6810 LTE, as well as all devices and electronic components contained in the package, may **not** be disposed with household waste.

Please bring FRITZ!Box 6810 LTE to a collection point in your local community for the disposal of electric and electronic appliances after use.



Symbol for the separate collection of electric and electronic devices

Note the symbol for the separate collection of electric and electronic devices. FRITZ!Box 6810 LTE and the electronic parts included with delivery must be disposed of separately from household waste.

Glossary

3GPP

short for 3rd Generation Partnership Project

3GPP is an international project in which standardization bodies work together to standardize mobile communications. Participants in the project include the ETSI (European Telecommunications Standards Institute).

bandwidth management

Bandwidth management distributes the available bandwidth of an Internet connection among various Internet applications.

The bandwidth management of the FRITZ!Box ensures that the speech quality during telephone calls over the Internet is not reduced by surfing activity. The FRITZ!Box adjusts all uploads and downloads to the currently available bandwidth. Furthermore, the FRITZ!Box grants Internet telephony connections a higher priority than Internet data connections. This largely prevents undesired disruptions during Internet telephone calls.

DDNS

short for Dynamic Domain Name System

DDNS is a service which allows a computer always to be reached under the same domain name despite constantly changing public IP addresses. This means the home network can always be reached from the Internet, regardless of the user's location. Even private users have an economical way of placing their own Internet offers on their computer at home.

Every time the Internet connection is established, the Internet service provider assigns a new public IP address.

Each time the IP address changes, the current IP address is transmitted to a special DDNS server. Except for the few seconds between the cancellation of the old IP address and the notification of the new IP address, the computer can always be reached at the selected domain name.

DECT

short for Digital Enhanced Cordless Telecommunications

DECT is a European standard for cordless telephony which was drafted by the European Telecommunications Standards Institute in 1991 and officially adopted in 1992. DECT defines the air interface between a mobile handset and its base station, and supports both voice transmission and data transmission with flexible transfer speeds.

default gateway

Gateway (see glossary)

DHCP

short for Dynamic Host Configuration Protocol

DHCP is a protocol for dynamically negotiating the operating parameters of the TCP/IP protocol (see glossary). The computers in a local IP network (DHCP clients) access the DHCP server as part of their operating systems' start procedure.

The central administration of the TCP/IP operation parameters makes it possible to avoid address conflicts caused by IP addresses (see glossary) accidentally assigned more than once.

DHCP is used in IPv4 networks (see glossary).

DHCP server

The DHCP server assigns each client an IP address that it has not yet been assigned at the present time. The DHCP server also informs the client of the IP addresses of the DNS server to be used and of the default gateway. In assigning the IP addresses the DHCP server selects from a prescribed range of IP addresses.

DHCP is used in IPv4 networks (see glossary).

DNS

short for Domain Name System

Domain Name Service takes care of determining the IP address for a given domain name. This Domain Name Service runs on every computer. It accepts the domain name entered by a user and inquires about the corresponding IP address at a DNS server known to the service. If a DNS server cannot answer the inquiry itself, it can inquire about the IP address (DNS resolution) at other DNS servers.

If the Domain Name Service receives negative information from the DNS server (domain name not known), it can send inquiries to other DNS servers it knows or return a corresponding error message to the user. If it receives the desired IP address instead, the application can use the IP address to retrieve the destination desired by the user.

This hierarchical system of DNS servers is known as the Domain Name System. The addresses of the DNS servers at which the Domain Name Service is to inquire by default generally are handed over to the computer by the Internet service provider automatically whenever a connection to the Internet is established.

download

Download designates the transfer of files from the Internet to a computer.

dynamic IP address

A dynamic IP address is an IP address valid only for the duration of one Internet or network session.

Every computer participating in the Internet must have a uniquely assigned public IP address. Since only a limited number of such IP addresses is available, they must be used sparingly. That is why most of the Internet participants who dial in to the Internet receive a dynamic IP address. They are called dynamic because every participant receives a new public address that has not been assigned yet each time she or he connects to the Internet.

By contrast, dynamic addresses are usually used in local IP networks because they are easy to handle, and because using them avoids incorrect IP address entries or unintentional double assignments.

fixed IP address

Fixed IP addresses are IP addresses (see glossary) which are permanently assigned to a computer or another device like a network printer.

Assigning fixed IP addresses makes sense in cases where a computer is always supposed to be accessible at a certain address (for instance, a web server or an e-mail server).

firewall

A firewall protects a computer or local network against attacks from the Internet.

Most firewalls work with packet filters, which merely check the IP addresses and port numbers of incoming and outgoing data packets and filter the packets according to prescribed rules.

Within IPv4 networks, some firewalls also integrate additional concepts like IP masquerading and NAT to decouple data traffic by distinguishing strictly between the internal and external network.

Especially effective firewalls go even further, analyzing and evaluating the contents of the packets and filtering them according to prescribed rules. Such techniques may also include a Stateful Packet Inspection Firewall, for instance.

firmware

The firmware is the software of an electronic device, which is stored in the device and controls its functions.

FTP

short for File Transfer Protocol

The File Transfer Protocol allows files to be exchanged between two computers in the Internet. A computer on which the files are made available for downloading is called an “FTP server”. A special program is required for downloading files, known as an “FTP client”. Some web browsers contain FTP clients, but they are also available as independent software.

gateway

Gateway is a general term designating an interface between two networks. Such a network interface can be realized using a router or a bridge, for instance.

If a computer wants to transfer data packets to a computer in another network, it must first transmit the packet to the gateway. To do this, the computer must know the address of the gateway.

If all packets that cannot be delivered in a local network always are to be transmitted to their given recipients via the same gateway, for this purpose the address of the gateway must be saved as the default gateway in the network settings of the computer.

If a router is used for the shared Internet access in a local network, the IP address of the router must be entered as the default gateway in the TCP/IP settings of each computer that wishes to use the Internet connection.

hub

A hub is a device that is used to connect network devices to each other, for instance through an Ethernet. Network devices are connected to each other in a star network, with each network device connected to the hub. There are no direct connections between the network devices.

A hub can either send or receive data. Received data are sent to all connected devices. All connected devices share the data throughput.

Internet telephony

VoIP (see glossary)

IP

short for Internet Protocol

The IP Internet Protocol is the most important basic protocol for the control of data exchange in local networks and in the Internet. The Internet protocol works without a connection; in other words, data packets are transmitted from the sender to the recipient without previous consultation. The addresses of the recipient and the sender in the data packets are given as IP addresses.

IPv4

short for Internet Protocol version 4

IPv4 is currently the conventional Internet protocol.

IPv4 addresses are 32 bits long, such that IPv4 offers an address space of 2^{32} IP addresses, or just over four billion. The latest estimates suggest that the last IPv4 addresses will be assigned by the beginning of 2012.

The successor protocol to IPv4 is IPv6.

IPv6

short for Internet Protocol version 6

IPv6 is the successor protocol to IPv4.

IPv6 addresses are 128 bits long. This means that IPv6 makes approximately 340 undecillion (~ 3.4 x 10^{36}) IPv6 addresses available. Each private user can be allotted over 18 quintillion public IPv6 addresses from her or his Internet service provider.

The dearth of addresses in IPv4 is only one of the reasons for introducing IPv6. IPv6 also offers additional advantageous characteristics in the framework of communication within IP networks.

IP address

In IP-based networks, for instance in the Internet and local networks, all connected devices are addressed via their IP addresses. So that data packets are sure to be delivered to the right address, each IP address may be assigned only once within the local IP network.

IPv6 addresses are structured differently from IPv4 addresses. IP addresses can be written in decimal, octal or hexadecimal format.

IP masquerading

IP masquerading is a technique used within IPv4 networks. With IP masquerading a computer or LAN can be protected from unauthorized connection requests from the Internet. Masquerading works by converting the IP addresses used in a network to one public IP address. From the outside it appears as if all requests are sent from a single computer.

IP network

A network in which data exchange takes place on the basis of the Internet Protocol (IP) is called an IP network.

LTE

short for Long Term Evolution

LTE is a mobile network technology standard specified by the 3GPP Release 8. LTE provides for high throughput rates and is quite suitable for mobile Internet.

NAT

short for Network Address Translation

NAT is a technique used within IPv4 networks. NAT is used in routers to replace the address information in data packets with new address information. A typical application for NAT is routers that connect local networks with the Internet. In local networks, every network device has a private IP address, while generally there is only one public IP address available for the Internet. To grant the network devices access to the Internet, the router replaces the private IP address of the sender with its own public IP address in all outgoing data packets. The router saves all necessary information in a table so that incoming data packets can then be assigned to the correct network device.

outside dialing prefix

For outside dialing from a telephone system, often the telephone number must be prefixed with a “0”.

In order to establish a call to another party from a telephone system (PBX), first dial the outside dialing prefix and then the external number. If no outside dialing prefix is dialed, the call will be placed within the telephone system.

If automatic outside dialing is enabled on the telephone system, the outside dialing prefix is automatically dialed before the telephone number.

port

So that a single network connection on a computer can be used by multiple applications to exchange data with remote sites at the same time, a computer administers what are known as ports for the IP-based protocols TCP and UDP. Ports substantiate the point of access for the data packets delivered via the IP Internet protocol. While the IP address determines the destination computer quite generally, the port addresses the communication interface provided by an application for a certain communication procedure.

The Internet protocol allots 16 bits for the specification of the port number. Thus a total of 65,535 different port numbers can be specified. Ports up to port number 1,024 are reserved for special system applications and typical Internet applications. These include, for instance, the port numbers 21 for FTP (File Transfer Protocol), 25 for SMTP (Simple Mail Transfer Protocol), 53 for DNS (Domain Name Service) and 80 for HTTP (Hypertext Transfer Protocol).

Ports are primarily of interest to users for their role in protecting an Internet connection from external attacks. Most firewalls offer the possibility of preventing data traffic on certain ports. This means that certain port numbers can be blocked to prevent data from being delivered to system services. This is also a way of preventing any Trojans (malicious applications opening backdoors on computers) that may have infected your computer from receiving data on ports it created as means of accessing your computer for potentially damaging activities. A firewall blocks most of the atypical port numbers not required for normal operation of an application and offers specialized users the opportunity to forward specified ports.

port forwarding

With port forwarding it is possible to specify ports that will allow all incoming or outgoing data packets to pass through a router or firewall.

If a computer from the local network offers server services, for instance, the settings of a router using NAT (see glossary) or IP masquerading (see glossary) must enable or forward the

port used by the server service for access to incoming data packets and thus keep it open permanently. The private IP address of the given computer must be saved as the destination address for all of the packets arriving at the port.

Typical server applications that require port forwarding are FTP and web servers. To allow access to a computer via remote management software like Symantec pcAnywhere or Microsoft's Remote Desktop, or even use of a file-sharing program like eDonkey, the required ports must be released for port forwarding. Port forwarding settings for the most important application cases are quite simple as long as the settings of the router or the firewall already contain rules with a corresponding preconfiguration.

private IP address

Private IP addresses are used for computers and other network devices within local IPv4 networks.

Since many local IP networks are not connected to the Internet except via single computers or routers (gateway), certain address ranges are excluded from the publicly available IP addresses so that they are available for assignment in local IP networks. An IP address may be assigned only once within the local network. A private IP address may exist in any number of other local networks.

public IP address

A public IP address is an IP address (see glossary) valid in the Internet. Every computer or router participating in the Internet must have a uniquely assigned public IP address. This address is usually negotiated dynamically with the Internet service provider when a connection to the Internet is dialed. The Internet service provider assigns the negotiated IP address to the computer or router for the duration of an Internet session.

subnetwork

A local IP network can consist of one subnetwork or be divided into multiple subnetworks. The division into subnetworks is performed when the local IP network is configured. The subnetworks of a local IP network are also IP networks (see glossary).

subnet mask

The subnet mask indicates which part of an IP address (see glossary) is the network address and which the address of the computer. The network address defines what is called the subnet.

switch

A switch is a device that connects multiple network devices with each other, for instance through an Ethernet.

In contrast to a hub, a switch can establish direct connections between the connected devices. This makes it possible to send data packets directly to specific recipients.

The entire data throughput is at the disposal of every connected device.

TCP/IP

short for Transmission Control Protocol / Internet Protocol

TCP/IP is the “language” of the Internet. TCP/IP is used to refer to a suite of protocols used for data communication over the Internet. TCP and IP are the network and transport protocols underlying most Internet services, including file transfer (FTP) and e-mail communication (SMTP). TCP/IP is available for practically all computer systems. TCP/IP thus offers the advantage of trouble-free communication between otherwise incompatible networks and systems.

update

A more recent version of software or firmware is called an update. Updates are often free of charge, resolve minor programming errors, and sometimes also offer new functions.

uplink port

The uplink port on a hub or switch is designed for connecting another hub or switch, or a router. In contrast to the uplink port, there is also a user port for connecting terminal devices. The send and receive directions are transposed on the uplink port. On some devices the port can change between normal and uplink mode by means of a switch.

upload

This term designates the procedure of transmitting files from one's own computer to another computer in the Internet.

UPnP

short for Universal Plug and Play (UPnP)

UPnP is an extension of the Microsoft Plug & Play standard that allows devices to network globally and to exchange services—without a central server or computer.

UPnP allows devices from all kinds of manufacturers (stereo systems, routers, printers, house controls) to be controlled via an IP-based network (see glossary), with or without central control through a gateway. It is based on a number of standardized network protocols and data formats. Expressed simplistically, devices can communicate with each other automatically using UPnP to exchange information.

Today the UPnP forum specifies the UPnP standard and certifies devices that are compliant with this standard.

UPnP AV

short for Universal Plug and Play Audio/Video

UPnP AV is a UPnP specification for the interaction between the media server, playback devices and devices controlling the streaming (transmitting a data stream) of audio, image and video data within networks. Media servers are devices that make audio, image and video data available upon request. Playback devices render the audio, image and video data (television, stereo system, streaming clients). Control devices are remote controls (smartphone, remote control).

VPN

short for Virtual Private Network

VPN serves to integrate devices from a neighboring network into your own network, without the networks having to be compatible with each other.

A VPN is generally an independent company network distributed over several locations, which uses the infrastructure of a public communications network to link its partial networks or to link individual computers to the rest of the network. A VPN uses tunneling technologies and typically builds on the infrastructure of the Internet.

Using a Virtual Private Network it is possible to use all network applications of the company network even from distant locations. This means it is possible to use the advantages of the network even over large geographical distances.

VPN facilitates optimum information flow without delay throughout the entire company, even to offices in other locations. E-mail servers, file sharing and other central applications of the company network can thus be made available via VPN even to distant branch offices, subsidiaries and home offices. With VPN, field representatives of a company can also be granted secure access to the company network.

VoIP

short for for Voice over IP, also known as Internet telephony

Calls from the Internet are possible to and from the fixed-line network and mobile communications networks. Various Internet service providers and telephony carriers provide SIP-fixed-line gateways for this purpose. The gateways are used to produce voice connections between the Internet and conventional telephone networks.

In principle, VoIP calls can be made over any Internet connection. However, for convenient use with existing terminal devices, and for conversations with the fixed-line and mobile communications networks, it is important that the Internet service provider support what is known as the SIP standard. SIP is the current standard defined for VoIP by the IETF (Internet Engineering Task Force).

WLAN

short for Wireless Local Area Network

The term WLAN designates the industry standard for wireless local networks passed by the Institute of Electrical and Electronics Engineers (IEEE) in 1997 under the title IEEE 802.11.

By means of WLAN technology, individual computers or network devices like printers or DSL access points can be linked wirelessly to an existing cable-connected local network (LAN), or LANs can be converted completely to a wireless structure. A further useful purpose for WLAN technology is to link segments of existing cable-connected networks.

Although WLAN was actually developed only for short-range connections, by cascading WLAN base stations or implementing transmission networks with high-power point-to-point radio transmission, even network segments located further away from each other can be linked or network participants in relatively remote locations can be economically and easily integrated into an existing network.

WLAN base stations often also serve as access points to the Internet in private or public institutions. Many airports, hotels and cafes, for instance, make WLAN hotspots available to

their customers, either free or subject to a charge. Ultimately this has maneuvered WLAN into serious competition with mobile UMTS technology.

The application possibilities for wireless network communication also overlap with Bluetooth technology. For mobile devices with limited energy capacity Bluetooth is the more useful solution, however, as Bluetooth uses considerably less power than wireless LAN. What is more, Bluetooth technology is more flexible and thus can offer a greater bandwidth of potential applications.

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